Milpitas Town Center Redevelopment

Final Transportation Impact Analysis

Prepared for:
Shapell Industries of Northern California

Prepared by: Hexagon Transportation Consultants, Inc.

February 27, 2004

Table of Contents

 Intro Exist Back Proje Futur 	duction	
Appen	dices	
Appendix I Appendix I Appendix I Appendix I List of	Approved Trips Inventory Volume Summary Tables Level of Service Calculations Signal Warrant Sheets	
LIST OI	lables	
Table ES 1	Intersection Level of Service Summary	xi
Table 1	Intersection Level of Service Definitions Based on Delay	5
Table 2	Freeway Segment Level of Service Definitions Based on Density	6
Table 3	Existing Intersection Levels of Service	14
Table 4	Existing Freeway Levels of Service	
Table 5	Background Intersection Levels of Service	19
Table 6	Project Trip Generation Estimates	23
Table 7	Project Intersection Levels of Service	28
Table 8	Project Queuing Analysis	
Table 9	Project Freeway Levels of Service	35
Table 10	Representative Hourly Parking Accumulation By Percentage of Peak Hour	
Table 11	Estimated Hourly Parking Demand for Shopping Center	40
Table 12	Future Intersection Levels of Service	
List of	Figures	
Figure 1	Site Location and Study Intersections	2
Figure 2	Existing Bicycle Facilities	
Figure 3	Existing Transit Service	
Figure 4	Existing Lane Configurations	
Figure 5	Existing Traffic Volumes	
Figure 6	Background Traffic Volumes	18
Figure 7	Project Trip Distribution - Townhomes	
Figure 8	Project Trip Distribution - Supermarket	
Figure 9	Project Trip Assignment	
Figure 10	Background Plus Project Traffic Volumes	27
Figure 11	Hillview Drive and Town Center Existing Conditions	
Figure 12	Hillview Drive and Town Center Mitigation Alternative 1	
_	~	

Executive Summary

This report presents the results of the traffic impact analysis (TIA) conducted for the proposed Milpitas Town Center redevelopment project in Milpitas, California. Currently, the site has 246,925 square feet (s.f.) of retail development plus 35,000 s.f. of theaters (10 screens). The proposed project would eliminate the existing movie theater and remodel the retail space, although the total amount of retail floor area would remain the same. The project also would add 65 townhomes toward the back of the site. The 246,925 s.f. of remodeled retail space would include a 54,000 s.f. supermarket. Access to the site is provided via Calaveras Boulevard, Milpitas Boulevard, and Hillview Drive.

The potential impacts of the project were evaluated in accordance with the standards set forth by the City of Milpitas level of service policy and the Santa Clara Valley Transportation (VTA) Congestion Management Program (CMP). The study included an analysis of AM, PM and Saturday peak-hour traffic conditions for six signalized intersections and one signalized intersection. A midday peak hour analysis was conducted for two study intersections. Signal warrants were checked at the unsignalized intersection of Hillview Drive/Town Center Drive to determine whether installation of a traffic signal would be justified. A CMP freeway level of service analysis was performed based on AM and PM peak hour volumes.

Project Trip Generation

Through empirical research, data have been collected that correlate to common land uses their propensity for producing traffic. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. The magnitude of traffic added to the roadway system by a particular development is estimated by multiplying the applicable trip generation rates to the size of the development. The daily, AM, PM and Saturday standard trip generation rates applied to the shopping center and supermarket were based on those contained in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 6th edition. The Saturday trip rates applied to the townhouse development portion of the site also were based on ITE trip rates. At the request of the City of Milpitas, the daily, AM, and PM standard trip generation rates used for the proposed townhouse development were based on those recommended by the San Diego Association of Governments (SANDAG). These rates were used since they are generally higher than the ITE rates. Thus, the SANDAG trip generation rates represent a more conservative approach than the ITE rates.

Based on the corresponding recommended daily trip generation rates shown in Table 6 of this report, it is estimated that the proposed redevelopment of the Milpitas Town Center would generate 3,668 new daily trips, with 191 new trips during the AM peak hour, 362 new trips during the PM peak hour, and 335 new trips during the Saturday peak hour. Using the specified inbound/outbound splits, the project would produce an increase of 100 inbound and 91 outbound trips during the AM peak hour, 185 inbound and 177 outbound trips during the PM peak hour, and 169 inbound and 166 outbound trips during the Saturday peak hour.

Project Impacts

Intersection Impacts

Measured against the City of Milpitas and CMP level of service impact criteria, no signalized study intersection would be significantly impacted by the project.

Other Transportation Issues

Hillview Drive/Town Center Driveway Operational Issues

Currently during the midday and PM peak hours of traffic, a vehicle queue occasionally develops on the north leg of the intersection of Hillview Drive/Calaveras Boulevard. At times the queue extends back past the Hillview/Town Center driveway, thereby blocking the left turns into and out of the driveway. When the northbound left-turns into the driveway are blocked the northbound left-turn vehicle queue could extend out of the pocket, thus blocking northbound through traffic on Hillview Drive, although this phenomenon did not occur during our observations. This situation could potentially affect the operations at the intersection of Hillview Drive/Calaveras Boulevard. Project traffic would add to this potential operational problem.

Improvement Alternative 1 – Full Access Unsignalized Driveway

In order to remediate this operational problem, the inside southbound left-turn lane at the intersection of Hillview Drive/Calaveras Boulevard could be extended back to the Town Center driveway location in order to provide additional queuing storage. This improvement is feasible if the northbound movement of the north leg of the intersection is reconfigured as shown in Figure 12. (Figure 11 shows the existing configuration for comparison purposes.) This improvement would substantially reduce the likelihood that the project driveway would be blocked by a queue of vehicles.

Improvement Alternative 2 – Limited Access Unsignalized Driveway

The Hillview/Town Center driveway could be designated right in/right out only, and a raised median could be installed on Hillview Drive to prohibit left turns into and out of the Town Center driveway. Left turns out of the Lyons Restaurant driveway would need to be accommodated with appropriate median design to implement this improvement alternative.

Hillview Drive and Town Center Driveway Unsignalized Intersection Level of Service

The unsignalized intersection of Hillview Drive and Town Center Driveway was analyzed for level of service under project conditions based on 4 possible access alternatives. A description of each driveway access alternative and the corresponding levels of service for the worst movement are shown below.

		Worst Me	ovement
	Peak	Ave.	
Description of Hillview Drive/Town Center Driveway Access	Hour	Delay	LOS
Alternative 1 - Full Access @ Town Center DW	AM	20.2	С
	PM	39.6	E
	Sat	25.1	C
Alternative 2 - Limited Access (No LT into or out of Town Center DW)	AM	12.6	В
	PM	14.2	В
	Sat	12.6	В
Alternative 4a - New RT Lane on Calaveras + Full Access @ Town Center DW	AM	17.9	С
	PM	22.3	С
	Sat	17.0	С
Alternative 4b - New RT Lane on Calaveras + No LT into Town Center DW	AM	14.1	В
	PM	14.2	В
	Sat	12.6	В

Improvement Alternative 3 – Signalized Driveway

Signal Warrant Analysis

A peak-hour signal warrant check (*Caltrans Traffic Manual*, Chapter 9, Warrant 11) was performed at the unsignalized intersection of Hillview Drive and Town Center Drive to determine whether signalization would be justified on the basis of project peak hour volumes. The analysis revealed that this unsignalized intersection would not meet the Caltrans peak hour volume warrant during the AM, PM or Saturday peak hours of traffic and, therefore, would not warrant signalization under project conditions.

Although the intersection of Hillview Drive and Town Center Drive would not warrant signalization based on the Caltrans peak-hour volume warrant, additional traffic analysis was performed at this location to see if a signal would in fact be feasible during the AM and PM peak hours of traffic. A detailed traffic simulation model was developed to determine whether or not the intersection would function properly and efficiently if signalized. The results of the traffic signal analysis are described below.

Simulation Model Description

The analysis was conducted using the Synchro 5 and Sim Traffic software packages. Synchro 5 is used to model and optimize traffic signal timings, and employs the 2000 Highway Capacity Manual methodology for level of service analyses at signalized and unsignalized intersections. SimTraffic is a microscopic traffic simulation software package that utilizes input and output data from Synchro 5 to simulate traffic conditions on roadway networks.

The potential signal at Hillview Drive and Town Center Drive would be coordinated with the adjacent signal at Hillview Drive and Calaveras Boulevard. The simulation analysis demonstrated that with the current intersection configuration, the northbound left-turn vehicle queue occasionally would extend to

Calaveras Boulevard during the PM peak hour, but would not adversely affect operations at that intersection. The simulation model showed that once the queue reached Calaveras Boulevard, traffic began to flow and all queued vehicles were able to clear the intersection of Hillview Drive and Town Center Drive in one signal cycle.

The traffic simulation showed that a signal at the intersection of Hillview Drive and Town Center Drive would effectively serve the projected AM and PM peak hour traffic volumes and would operate efficiently.

Improvement Alternative 4 – New Driveway on Calaveras Boulevard

A new inbound only driveway with access off of westbound Calaveras Boulevard could be constructed at some location between the Calaveras/Hillview and Calaveras/Town Center intersections. The new driveway could be utilized by inbound traffic in conjunction with the Hillview/Town Center driveway. In this case, the new driveway would reduce the number of vehicles entering the shopping center at the full access Hillview/Town Center driveway. The new inbound driveway also could replace the northbound left-turn access at the Hillview/Town Center driveway, thus receiving all of the inbound traffic that would have used the northbound left-turn lane at Hillview/Town Center driveway.

Recommendation

Once the proposed Milpitas Town Center redevelopment project is complete, the unsignalized intersection operations of Hillview Drive and Town Center Drive should be closely monitored. Should the intersection experience operational problems, one of the improvement alternatives described above should be implemented.

Intersection Operations Analysis

An operations analysis was performed for study intersections where the project would add trips to the left-turn movements. The analysis indicated that the estimated maximum vehicle queues for some of the high-demand left-turn movements would exceed the existing vehicle storage capacity under project conditions. The following intersections would have inadequate storage capacity under project conditions.

Abel Street & Calaveras Boulevard – WB left-turn movement (AM, PM and Sat peak hours)

The westbound left-turn movement currently has one left-turn lane with approximately 325 feet of queuing storage. Under background conditions, the movement would require 450 feet of queuing storage during the Saturday peak hour. The project would add 15 trips to the westbound left-turn movement during the Saturday peak hour, thereby increasing the 95th percentile queuing demand by one vehicle. Adding a second westbound left-turn lane would improve the intersection operations at this location by providing a total of approximately 650 feet of queuing storage, which is more than the 450 feet of storage that would be required under project conditions.

Milpitas Boulevard & Town Center Drive – SB left-turn movement (AM, PM and Sat peak hours)

The southbound left-turn movement currently has one left-turn lane with approximately 115 feet of queuing storage. Under background conditions, the movement would require 100 feet of queuing storage during the PM peak hour. The project would add 41 trips to the southbound left-turn movement during the PM peak hour, thereby increasing the 95th percentile queuing demand by two vehicles (50 feet).

Extending the southbound left-turn pocket by approximately 35 feet in order to provide the 150 feet of queuing storage that would be necessary under project conditions would improve the overall operations at this intersection. Median landscaping would need to be removed in order to extend the turn pocket. City of Milpitas staff should decide whether they want to pursue this potential improvement.

Project Freeway Segment Analysis

Project traffic volumes on freeway segments were calculated by adding to existing freeway volumes the estimated project trips on freeway segments. The results show that three of the freeway segments analyzed would operate at an unacceptable LOS F during the PM peak hour under project conditions. However, none of the segments would be impacted by the project according to the CMP definition of freeway impacts. All other analyzed freeway segments would operate at an acceptable LOS E or better during the AM and PM peak hours.

Site Access, On-Site Circulation and Parking

The proposed site plan was evaluated for site access, on-site circulation, and parking.

Overall Site Access

The proposed site plan shows that the three existing full-access driveways will continue to provide access to the site. One signalized driveway is located on Milpitas Boulevard, another signalized driveway is located on Calaveras Boulevard, and one unsignalized driveway is located on Hillview Drive. These driveways would be sufficient to serve the estimated project traffic. The majority of traffic generated by the townhouse development would use either the Milpitas/Town Center or the Hillview/Town Center driveways. Project traffic generated by the shopping center and supermarket would be distributed more evenly between the three access driveways.

Truck Access

An analysis was conducted to determine the adequacy of driveway access and on-site circulation for two categories of large trucks with varying turning radii. The truck categories included in the analysis were truck types WB 40, which represents semi-trailer trucks, and SU 30, which includes small buses, garbage and other single unit trucks. Based on the analysis, all three of the main driveways provide sufficient dimensions for ingress and egress of delivery trucks.

On-Site Circulation

Townhouse Circulation

The on-site circulation was reviewed in accordance with generally accepted traffic engineering standards. Based on the current site plan, the "ring road" that circles the townhouse development is at least 25 feet wide and would allow for efficient vehicular circulation around the townhouse development. Guest parking spaces would be located along the ring road, as would the trash dumpsters. Based on an analysis

of on-site circulation for truck type SU30, the large turning radii on the ring road would make it easy for garbage trucks to maneuver around the townhouse development.

The site plan shows that there are four dead-end drive aisles within the proposed townhouse development. These drive aisles are approximately 25 feet wide. Dead-end aisles are generally undesirable from a circulation perspective because upon entering, drivers may discover that there is no available parking and, therefore, must either back out or perform a three-point turn. However, from a residential planning standpoint, dead-end aisles are often desirable. Most residents would rather live on a cul-du-sac than along a through street because of the lower traffic volumes. All four dead-end aisles would provide direct access to private townhouse garages and would contain no guest parking spaces. In areas such as these where private garages and driveways are designated to specific individuals, dead-end aisles are not problematic. Drive aisles should be designed to meet City of Milpitas standards, which accommodate passenger vehicles as well as emergency vehicles.

The site plan shows good pedestrian circulation within the townhouse development. Pedestrians can easily access the shopping center, including the surrounding roadways and bus stops via the adjacent sidewalks. A gazebo and observation deck is proposed as part of the project along Berryessa Creek. The City is proposing to build a pedestrian bridge across the creek at this location, thereby connecting the adjacent neighborhood and Peter D. Gill Memorial Park.

Shopping Center/Supermarket Circulation

The proposed revisions to the shopping center would result in very few changes to vehicular circulation on-site. The townhouse development would climinate the existing northernmost parking field. Thus, on-site circulation would occur exclusively on the roads and within the parking aisles south of the renovated shopping center buildings. The areas south of the renovated buildings would remain virtually unchanged.

Supermarket delivery trucks would enter the site via the intersection of Milpitas Boulevard/Town Center Drive and proceed to the truck loading dock, which is located in the rear of the supermarket less than 700 feet from the intersection. The loading dock area consists of a one-way drive aisle and is relatively isolated from other traffic on-site, thereby minimizing conflicts with other vehicles. An analysis was conducted to determine the adequacy of on-site circulation for truck type WB 40, which represents semi-trailer delivery trucks. Based on the analysis, the loading dock area would provide sufficient space for supermarket delivery trucks to maneuver.

Currently, the shopping center contains very few pedestrian paths. According to the site plan, new pedestrian paths and crosswalks are proposed throughout the site. The new facilities would greatly improve pedestrian circulation and safety, and would attract walking trips to and from the proposed townhouse development. Overall, the site plan shows good pedestrian circulation within the shopping center and surrounding buildings on-site.

Parking Analysis

Townhouse Parking Requirements

Parking for the proposed townhouse development will be provided on-site via private garages and uncovered parking spaces along the outer ring road. It is assumed that parking within the townhouse development would be limited to residents and guests only. The project proponent should comply with

the City of Milpitas parking standards for very high-density multi-family districts (R4). The City of Milpitas Zoning Ordinance 8.06-1 states that a high-density development requires the following number of parking spaces:

- 1. Two (2) or more bedrooms: two (2) covered automobile stalls per unit required.
- 2. Guest parking: fifteen percent (15%) of automobile stalls required. May be covered or uncovered.
- 3. Bicycle parking: five percent (5%) of automobile stalls required.

Based on the City of Milpitas parking requirements, the townhouse development should provide 138 covered parking spaces for residents (based on 69 units), 21 guest spaces and 7 bicycle parking spaces. The site plan proposes 138 covered spaces for residents, 69 uncovered guest spaces, and 10 spaces reserved for the Cabana. Therefore, the project exceeds the City of Milpitas' parking requirements. Parking stalls should be designed to meet City of Milpitas standards.

The Americans with Disabilities Act of 1990, known as ADA, requires that developments with 201 to 300 parking spaces provide 7 handicapped spaces. Thus, the townhouse development should provide 7 handicapped spaces.

Shopping Center/Supermarket Parking Requirements

As currently proposed, the project will contain a total of 246,925 square feet (s.f.) of commercial space, including 210,925 s.f. of retail space and approximately 36,000 s.f. of restaurant space with a total of 1,137 seats. The proposed project includes surface parking with a total of 1,395 spaces within the shopping center/supermarket area.

The parking requirements for the proposed uses at the Milpitas Town Center were calculated based on the parking schedule rates contained in the City of Milpitas zoning ordinance. For retail uses, excluding restaurants, parking is to be provided at a rate of one space per 200 s.f. of gross building area. For restaurants, the current zoning ordinance requires one parking space per 3 seats plus 10 percent for employee parking. Thus, according to City code, the proposed retail space would require 1,055 parking spaces, and the proposed restaurants would require 417 parking spaces.

The parking demand generated by the proposed retail space is expected to peak at a different time of the day than the peak restaurant parking demand. Retail uses typically experience their peak parking demand between 12:00 and 3:00 PM, while restaurant parking typically peaks between 7:00 and 9:00 PM. Thus, summing the parking requirements calculated for the individual uses would result in an oversupply of parking on the project site. The City's zoning ordinance includes a provision that allows for a reduction in the total parking requirements for mixed-occupancy sites that include a mixture of day-time and night-time uses. Therefore, the total parking requirement for the proposed mixed-use project was calculated by applying the representative hourly accumulation factors obtained from the Urban Land Institute manual titled *Shared Parking* to the parking requirements calculated for each individual use.

The Milpitas Town Center would require the greatest number of parking spaces at 7:00 PM on weekdays when a total of 1,356 spaces would be required. It can be concluded that the proposed project parking supply of 1,395 spaces would meet the parking requirements expressed in the City's zoning ordinance after accounting for shared use.

According to the ADA, a development with 1,001 parking spaces or more is required to provide 20 handicapped parking spaces plus 1 handicapped space for each 100 spaces over 1,000. Based on a total of 1,395 shopping center spaces, the project is required to provide a total of 24 handicapped parking spaces.

Transit, Bicycle and Pedestrian Analysis

Although no deduction was applied to the estimated trip generation for the project, it can be assumed that some of the project trips could be made by transit. Assuming up to 5% transit mode share (which is probably the highest that could be expected) yields an estimate of 11 transit trips during the AM, 19 transit trips during the PM, and 17 transit trips during the Saturday peak hours. Given that the site is served by several bus routes, these riders easily could be accommodated by the existing bus service.

Bike lanes are provided on Milpitas Boulevard north of Yosemite Drive, on Main Street south of Calaveras Boulevard, and on Jacklin Road between Milpitas Boulevard and Park Victoria Drive. Bike routes are provided along Yosemite Drive east of Milpitas Boulevard, Park Victoria Drive between Jacklin Road and Landness Avenue, Abel Street between Milpitas Boulevard and Marylinn Drive, Marylinn Drive between Abel Street and Main Street, and Calaveras Boulevard east of Park Victoria. Some of the roadways within the project area, including Calaveras Boulevard, have a street rating of "extreme caution". Roadways with this rating would not be considered ideal travel routes for bicyclists. Although some of the major roadways are not considered ideal routes for bicyclists, some people may nonetheless choose to use them for commuting purposes.

The project should provide bicycle parking per VTA recommendations. The VTA recommends inclusion of bicycle lockers for long-term and employee use (Class I parking), and bicycle racks for short-term visitor parking (Class II parking). To be effective, bicycle racks and lockers must be placed such that security is maximized, pedestrian circulation is not adversely impacted, and they can be used to their maximum design capacity. Based on VTA's *Bicycle Technical Guidelines*, 1999, the VTA recommends 1 Class I bicycle parking space for every 3 residential multi-dwelling units plus 1 Class II space for every 15 units. This equates to approximately 23 Class I and 5 Class II bicycle parking spaces. For shopping centers/supermarkets, the VTA recommends 1 Class I bicycle parking space for every 30 employees plus 1 Class II space for every 6,000 square feet of building area. The total number of employees for the proposed supermarket is unknown. Thus, the number of Class I bicycle parking spaces was not calculated. Approximately 9 Class II bicycle parking spaces are recommended for the supermarket. The VTA suggests that bicycle parking be located at or near the entrances to the supermarket.

Pedestrian facilities near the project site consist primarily of sidewalks along the previously described local roadways and along streets within the surrounding residential areas. Sidewalks are available along both sides of Milpitas Boulevard and Hillview Drive. Sidewalks also are available along both sides of Calaveras Boulevard, with the exception of the south side of Calaveras between Milpitas Boulevard and Abel Street. Crosswalks are provided at all of the signalized study intersections.

The project would not impact transit, bicycle or pedestrian facilities in the vicinity of the site.

Table ES-1
Intersection Level of Service Summary

			Exis	ting	Backg	ground			Project		Fut	ure
Intersection	Peak Hour	Count Date	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Incr. In Crit. Delay	Incr. In Crit. V/C	Ave. Delay	LOS
Abbott Ave and Calaveras Blvd	AM	1/27/2000	63.6	E	77.2	E	78.9	Ε	2.5	0.01	82.7	F
	PM	9/29/1999	33.6	С	33.7	С	33.8	С	0.1	0.01	34.1	С
	Sat	3/22/2003	31.6	C	31.6	С	31.7	С	0.2	0.01	32.1	С
Abel St and Calaveras Blvd *	Peak Hour Date Delay LOS Crit. Incr. In Incr. In Ave. Delay LOS Delay LOS Delay LOS Crit. Delay Crit. V/C Detat Ave and Calaveras Blvd AM 1/27/2000 63.6 E 77.2 E 78.9 E 2.5 0.01 82 PM 9/29/1999 33.6 C 33.7 C 33.8 C 0.1 0.01 34 Sat 3/22/2003 31.6 C 31.6 C 31.7 C 0.2 0.01 32 St and Calaveras Blvd * AM 3/20/2003 45.0 D 50.5 D 51.5 D 1.3 0.01 53 PM 10/2002 49.8 D 53.2 D 57.4 E 6.5 0.03 59 Sat 3/22/2003 42.9 D 42.9 D 43.8 D 1.6 0.03 44 Mid 2001 41.8 D 42.8 D 44.5 D 2.0 0.03 44 Sas Blvd and Calaveras Blvd * AM 3/20/2003 41.4 D 47.2 D 49.5 D 3.3 0.01 51 PM 10/2002 42.9 D 43.1 D 43.8 D 0.5 0.01 44 Sat 3/22/2003 38.8 D 38.8 D 39.4 D 0.9 0.02 39 Mid 2001 47.3 D 47.4 D 48.1 D 1.2 0.02 48 Sat 3/22/2003 34.9 C 28.3 C 28.3 C 0.0 0.00 28 PM 3/15/2000 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 23.9 C 24.3 C 0.6 0.01 24 Sat 3/22/2003 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 35.0 D 35.4 D 0.8 0.01 35 Sat 3/22/2003 34.9 C 23.9 C 24.3 C 0.6 0.01 27 PM 3/20/2003 9.1 A 9.0 A 10.8 B 0.5 0.01 10 Sat 3/22/2003 9.1 A 9.0 A 10.8 B 0.5 0.01 10 Sat 3/22/2003 9.1 A 9.0 A 10.8 B 0.5 0.01 10 Sat 3/22/2003 10.5 B 10.5 B 12.7 B 3.3 0.03 12 Sat Salverance Delay Blvd and Town Center Dr AM 3/19/2003 26.9 C 26.9 C 27.7 C 1.1 0.01	53.2	D									
	PM	10/2002	49.8	D	53.2	D	57.4	E	6.5	0.03	59.1	E
	Sat	3/22/2003	42.9	D	42.9	D	43.8	D	1.6	0.03	44.1	D
	Mid	2001	41.8	D	42.8	D	44.5	D	2.0	0.03	44.9	D
Milpitas Blvd and Calaveras Blvd *	AM	3/20/2003	41.4	D	47.2	D	49.5	D	3.3	0.01	51.6	D
	PM	10/2002	42.9	D	43.1	D	43.8	D	0.5	0.01	44.2	D
	Sat	3/22/2003	38.8	D	38.8	D	39.4	D	0.9	0.02	39.6	D
	Mid	2001	47.3	D	47.4	D	48.1	D	1.2	0.02	48.5	D
Hillview Dr and Calaveras Blvd	AM	3/18/2003	28.5	С	28.3	С	28.3	C	0.0	0.00	28.5	С
	PM	3/15/2000	34.9	С	35.0	D	35.4	D	8.0	0.01	35.8	D
	Sat	3/22/2003	23.9	С	23.9	С	24.3	С	0.6	0.01	24.6	С
Peak Hour Date Ave. Delay LOS Delay Crit. Delay	0.02	7.8	Α									
	PM	3/20/2003	9.1	Α	9.0	Α	10.8	В	0.5	0.01	10.9	В
	Sat	3/22/2003	10.5	В	10.5	В	12.7	В	3.3	0.03	12.8	В
Milpitas Blvd and Town Center Dr	AM	3/19/2003	26.9	С	26.9	С	27.7	С	1.1	0.01	27.8	С
	PM	3/19/2003	28.9	С	28.9	С	30.0	С	2.9	0.06	30.1	С
	Sat	3/22/2003	34.5	С	34.5	С	33.2	С	1.0	0.02	33.4	С

^{*} Denotes a CMP intersection.

1. Introduction

This report presents the results of the traffic impact analysis (TIA) conducted for the proposed Milpitas Town Center redevelopment project in Milpitas, California. Currently, the site has 246,925 square feet (s.f.) of retail development plus 35,000 s.f. of theaters (10 screens). The proposed project would eliminate the existing movie theater and remodel the retail space, although the total amount of retail floor area would remain the same. The project also would add 65 attached residential dwelling units (townhomes) toward the back of the site. The 246,925 s.f. of remodeled retail space would include a 54,000 s.f. supermarket. Access to the site is provided via Calaveras Boulevard, Milpitas Boulevard, and Hillview Drive. The project site and the surrounding study area are shown on Figure 1.

Scope of Study

This study was conducted for the purpose of identifying the potential traffic impacts related to the proposed redevelopment. The potential impacts of the project were evaluated in accordance with the standards set forth by the City of Milpitas level of service policy and the Santa Clara Valley Transportation Authority (VTA) Congestion Management Program (CMP). The traffic analysis is based on peak-hour levels of service for six signalized intersections and one unsignalized intersection in the vicinity of the site. The project is expected to generate more than 100 peak hour trips. Therefore, a CMP freeway level of service analysis also was performed. The study intersections are:

Calaveras Boulevard and Abbott Avenue
Calaveras Boulevard and Abel Street *
Calaveras Boulevard and Milpitas Boulevard *
Calaveras Boulevard and Hillview Drive
Calaveras Boulevard and Town Center Drive
Town Center Drive and Milpitas Boulevard
Town Center Drive and Hillview Drive (Unsignalized)

CMP intersections are denoted with an asterisk (*).

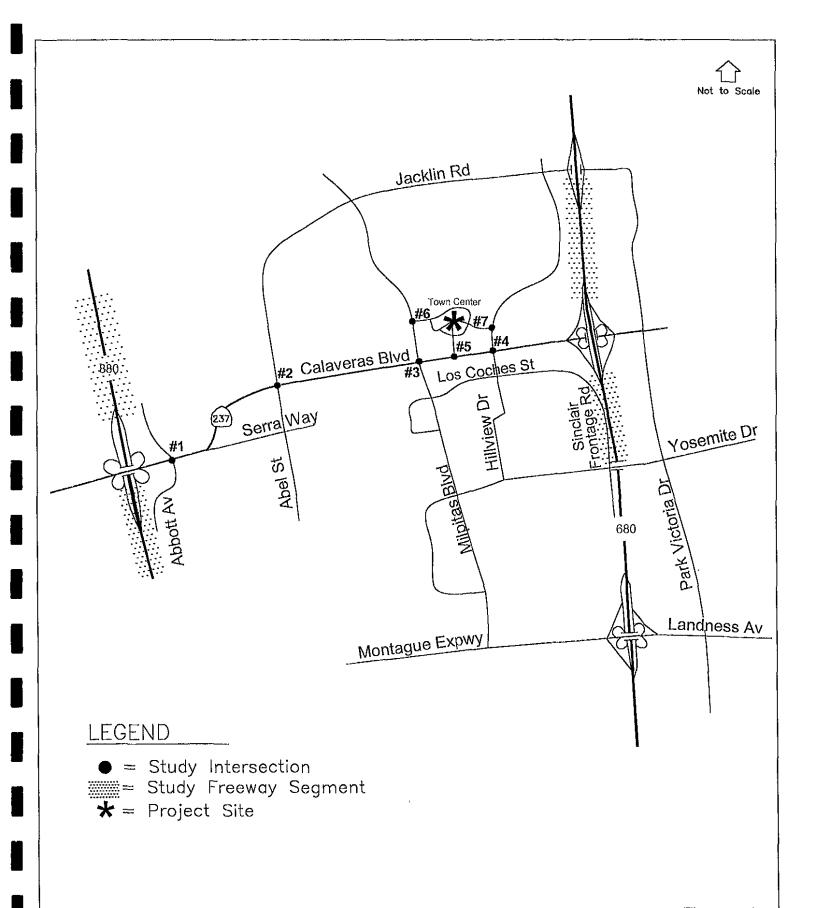


Figure 1

SITE LOCATION & STUDY INTERSECTIONS

Hexagon

■ Transportation Consultants, Inc.

The key freeway segments are:

I-680, between Yosemite Drive and Calaveras Boulevard

I-680, between Calaveras Boulevard and Jacklin Road

I-880, between Great Mall Parkway and Calaveras Boulevard

I-880, between Calaveras Boulevard and Dixon Landing Road

Traffic conditions at the study intersections were analyzed for the weekday AM and PM and Saturday peak hours of traffic. The AM peak hour of traffic is generally between 7:00 and 9:00 AM, the PM peak hour is typically between 4:00 and 6:00 PM, and the Saturday peak hour is typically between 1:00 and 3:00 PM. It is during these periods that the most congested traffic conditions occur on an average day. The CMP intersections of Calaveras/Abel and Calaveras/Milpitas also were analyzed for the weekday midday peak period, which is typically between 1:00 and 3:00 PM.

Traffic conditions were evaluated for the following scenarios:

- Scenario 1: Existing Conditions. Existing traffic volumes were obtained from the City of Milpitas and recent traffic counts. New 2003 counts were conducted during the AM peak hour. The 2003 counts were used for all study intersections with the exception of Abbott and Calayeras. A 2000 AM count was used for this intersection since the 2000 count was significantly higher than the 2003 count. For the PM peak hour, 2002 counts were used for the 2 CMP intersections. To be conservative, the City of Milpitas requested that 2000 PM counts be used for all non-CMP intersections where available. The reason for using 2000 PM counts is that the 2000 counts are consistently higher than the more recent 2003 PM counts. Where 2000 PM counts were not available, the new 2003 counts were factored up by 7% to represent the higher 2000 volumes. New 2003 counts were conducted during the Saturday peak hour. The City provided 2001 counts for the 2 CMP intersections for the weekday midday peak hour as well. However, the total existing traffic volumes at the two CMP study intersections are lower during the midday peak hour than during the PM peak hour. Thus, only an existing level of service analysis of the midday peak hour was conducted for these two CMP intersections.
- **Scenario 2:** Background Conditions. Background traffic volumes were estimated by adding to existing peak-hour volumes the projected volumes from approved but not yet completed developments. The latter component is contained in the City of Milpitas Approved Trips Inventory (ATI).
- **Scenario 3:** Project Conditions. Background traffic volumes with the project (hereafter called project traffic volumes) were estimated by adding to background traffic volumes the additional traffic generated by the project. Project conditions were evaluated relative to background conditions in order to determine potential project impacts.
- **Scenario 4:** Future Conditions. Traffic volumes under future conditions were estimated by applying a growth factor (1.2 percent per year) to existing volumes, adding trips from approved developments, and adding project trips. This scenario is evaluated in fulfillment of CMP requirements.

Methodology

This section presents the methods used to determine the traffic conditions for each scenario described above. It includes descriptions of the data requirements, the analysis methodologies, and the applicable level of service standards.

Data Requirements

The data required for the analysis were obtained from new traffic counts, previous traffic studies, the City of Milpitas, the 2002 CMP Annual Monitoring Report, and field observations. The following data were collected from these sources:

- existing traffic volumes
- existing lane configurations
- left-turn pocket lengths
- signal timing and phasing (for signalized intersections only)
- approved trips inventory (ATI)
- average speeds (for freeway segments only)

Analysis Methodologies and Level of Service Standards

Traffic conditions at the signalized study intersections were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The City of Milpitas analysis method is described below.

Signalized Intersections

All of the signalized study intersections are located in the City of Milpitas and are therefore subject to the City of Milpitas Level of Service standards. The City of Milpitas level of service methodology is TRAFFIX, which is based on the *Highway Capacity Manual* (HCM) method for signalized intersections. TRAFFIX evaluates signalized intersection operations on the basis of average delay time for all vehicles at the intersection. Since TRAFFIX is also the CMP-designated intersection level of service methodology, the City of Milpitas methodology employs the CMP default values for the analysis parameters. The level of service standard for all study intersections is LOS D, expect at the CMP intersections where the standard is LOS E. The correlation between average delay and level of service is shown in Table 1.

Unsignalized Intersections

For unsignalized intersections an assessment is commonly made of the need for signalization of the intersection. This assessment is made on the basis of the Peak-Hour Volume Signal Warrant, Warrant # 11 described in the Caltrans *Traffic Manual*. This method makes no evaluation of intersection level of service, but simply provides an indication whether peak-hour traffic volumes are, or would be, sufficient to justify installation of a traffic signal. The signal warrant was checked for the intersection of Hillview Drive and Town Center Drive.

Table 1
Intersection Level of Service Definitions Based on Average Control Delay

Level of Service	Description	Average Control Delay Per Vehicle (Sec.)
Α	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	Less than 10.0
В	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
С	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	Greater than 80.0

Freeway Segments

As prescribed in the CMP technical guidelines, the level of service for freeway segments is estimated based on vehicle density. Density is calculated by the following formula:

$$D = V / (N*S)$$

where:

D = density, in vehicles per mile per lane (vpmpl)

V = peak hour volume, in vehicles per hour (vph)

N = number of travel lanes

S = average travel speed, in miles per hour (mph)

The vehicle density on a segment is correlated to level of service as shown in Table 2. The CMP requires that mixed-flow lanes and auxiliary lanes be analyzed separately from HOV (carpool) lanes. The CMP specifies that a capacity of 2,300 vehicles per hour per lane (vphpl) be used for segments six lanes or wider in both directions and a capacity of 2,200 vphpl be used for segments four lanes wide in both directions. The CMP defines an acceptable level of service for freeway segments as LOS E or better.

Table 2
Freeway Segment Level of Service Definitions Based on Density

Level of Service	Description	Density (vehicles/mile/lane)
A	Average operating speeds at the free-flow speed generally prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	0-11
В	Speeds at the free-flow speed are generally maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high.	>11-18
С	Speeds at or near the free-flow speed of the freeway prevail. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more vigilance on the part of the driver.	>18-26
D	Speeds begin to decline slightly with increased flows at this level. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels.	>26-46
E	At this level, the freeway operates at or near capacity. Operations in this level are volatile, because there are virtually no usable gaps in the traffic stream, leaving little room to maneuver within the traffic stream.	>46-58
F	Vehicular flow breakdowns occur. Large queues form behind breakdown points.	>58

Source: Transportation Research Board, Highway Capacity Manual (2000), Washington, D.C.

Report Organization

The remainder of this report is divided into five chapters. Chapter 2 describes the existing roadway network and other transportation facilities. Chapter 3 presents the intersection operations under background conditions. Chapter 4 describes the method used to estimate project traffic and its impact on the transportation system and describes the recommended mitigation measures. Chapter 5 discusses the traffic conditions resulting from additional future growth. Chapter 6 presents the conclusions of the traffic impact analysis.

2.

Existing Conditions

This chapter describes the existing conditions for all of the major transportation facilities in the vicinity of the site, including the roadway network, transit service, and bicycle and pedestrian facilities.

Existing Roadway Network

Regional access to the project site is provided via I-680, I-880 and SR 237/Calaveras Boulevard. These facilities are described below.

I-680 is a north/south freeway that extends from Contra Costa County south to Santa Clara County where it connects to I-280 at its interchange with US 101. I-680 has six lanes north of SR 237 and eight lanes south of SR 237. A northbound HOV lane is currently under construction on I-680 north of Calaveras Boulevard. A southbound HOV lane north of Calaveras Boulevard recently was completed. I-680 carries 143,600 and 150,000 average daily traffic (ADT) north and south of SR 237, respectively.

I-880 is a north/south freeway providing regional access from East Bay cities to San Jose, where it becomes SR 17. Within the City of Milpitas, I-880 is primarily a six-lane freeway. North of Great Mall Parkway, I-880 widens to eight lanes. I-880 carries approximately 171,000 ADT north of SR 237, and 129,000 and 120,000 ADT north and south of Montague Expressway, respectively.

State Route 237/Calaveras Boulevard is an east/west arterial between I-880 and I-680 and generally provides six travel lanes (four on the Union Pacific overcrossing). West of I-880, this facility becomes a freeway with four mixed-flow lanes and two High Occupancy Vehicle (HOV) lanes. Calaveras Boulevard accommodates a significant amount of regional through traffic during the peak commute hours. Milpitas staff estimates that approximately 50 percent of the peak hour traffic between I-680 and I-880 is generated by areas outside of Milpitas. The predominate direction of travel is westbound in the morning and eastbound during the afternoon hours.

Local access to the site is provided by Milpitas Boulevard and Hillview Drive. These roadways are described below.

Milpitas Boulevard is a four-lane arterial that runs north from Montague Expressway to Dixon Landing Road, where it transitions into Warm Springs Road before entering Fremont. Milpitas Boulevard is divided north of Calaveras Boulevard and undivided south of Calaveras Boulevard. Milpitas Boulevard has a posted speed limit of 35 mph.

Hillview Drive is a two-lane collector street, which runs north from Yosemite Drive to Calaveras Boulevard. North of Calaveras Boulevard, Hillview Drive is a frontage road along I-680. The posted speed limit on Hillview is 30 mph.

Existing Bicycle and Pedestrian Facilities

Bike lanes are provided on Milpitas Boulevard north of Yosemite Drive, on Main Street south of Calaveras Boulevard, and on Jacklin Road between Milpitas Boulevard and Park Victoria Drive. Bike routes are provided along Yosemite Drive east of Milpitas Boulevard, Park Victoria Drive between Jacklin Road and Landness Avenue, Abel Street between Milpitas Boulevard and Marylinn Drive, Marylinn Drive between Abel Street and Main Street, and Calaveras Boulevard east of Park Victoria. The existing bicycle facilities within the study area are shown on Figure 2.

Calaveras Boulevard has a street rating of "extreme caution". Roadways that are rated "extreme caution" are characterized by the following:

- Heavy traffic volumes,
- High traffic speeds, at or greater than 35 mph,
- High number of motor vehicles turning right or merging across bicyclists' path of travel,
- Narrow travel area for bicyclists,
- Frequent bus service and stops, and
- High curbside parking turnover

Thus, Calaveras Boulevard would not be considered ideal travel routes for bicyclists.

Pedestrian facilities near the project site consist primarily of sidewalks along the previously described local roadways and along streets within the surrounding residential areas. Sidewalks are available along both sides of Milpitas Boulevard and Hillview Drive. Sidewalks also are available along both sides of Calaveras Boulevard, with the exception of the south side of Calaveras between Milpitas Boulevard and Abel Street. Crosswalks are provided at all of the signalized study intersections.

Existing Transit Service

Existing transit service to the study area is provided by the VTA and is shown on Figure 3.

VTA Bus Service

Three bus routes (Routes 70, 77 and 104) provide service within one-half mile of the project site. Currently, there is no LRT or commuter rail service near the project site. Bus stops are located on each side of Calaveras Boulevard and Milpitas Boulevard within walking distance of the project site. The bus routes directly serving the project site are described below.

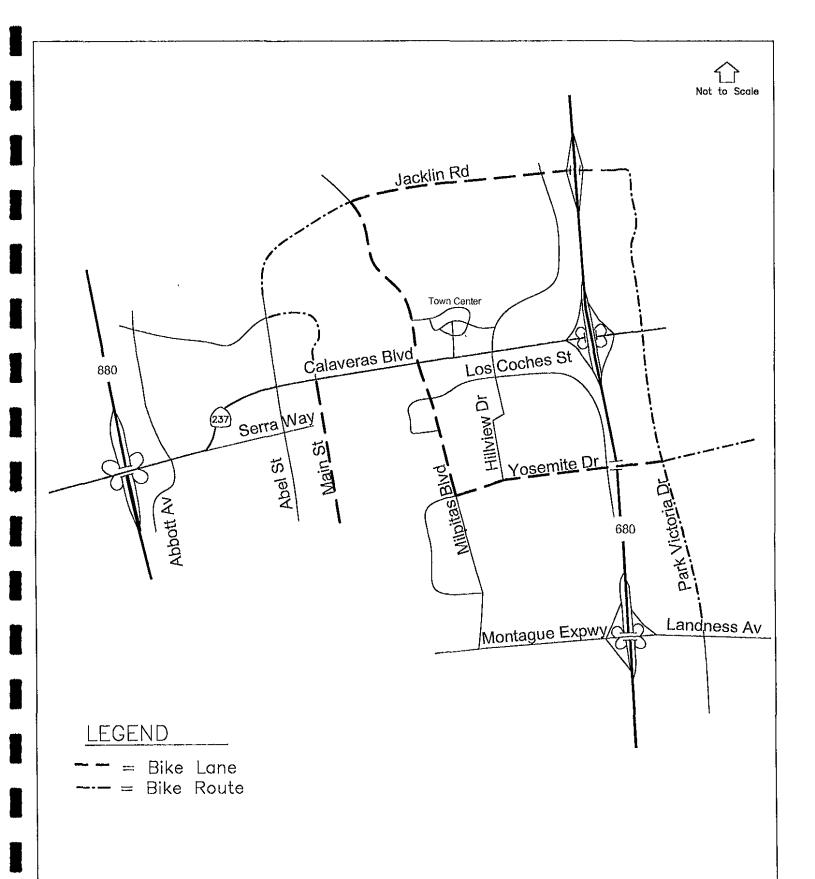


Figure 2

EXISTING BICYCLE FACILITIES

Hexagon

Transportation Consultants, Inc.

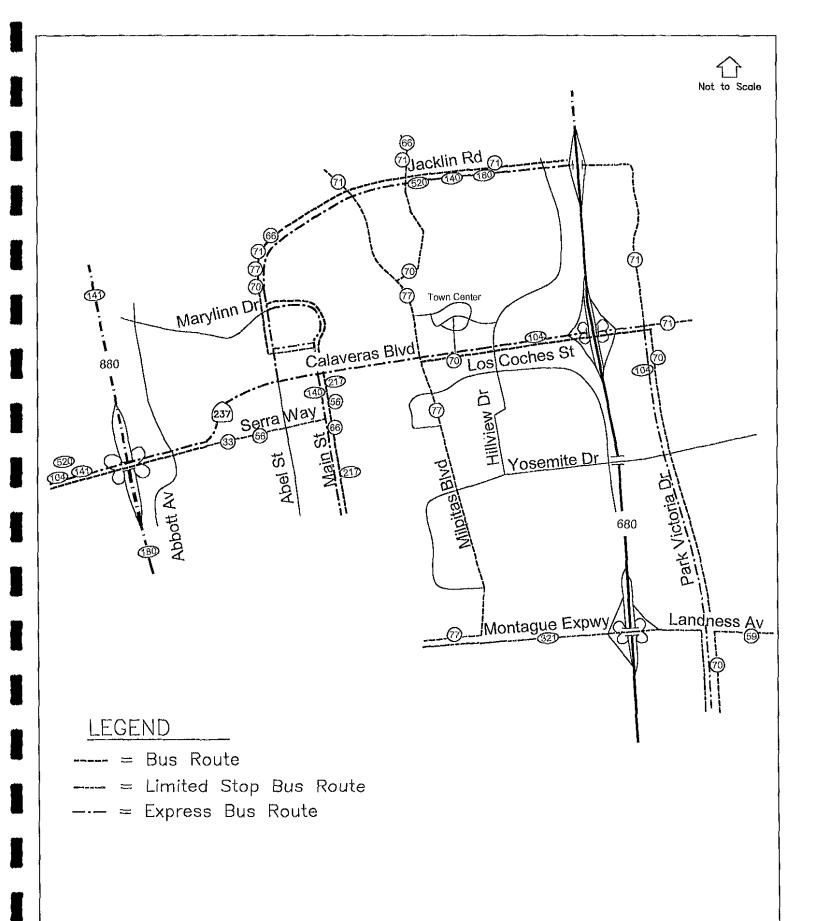


Figure 3

EXISTING TRANSIT SERVICE

Hexagon

■ Transportation Consultants, Inc.

Bus Route 70 provides service between the Capitol LRT station in San Jose and the Weller and Main transit center in Milpitas. This line operates on a 15-minute headway during commute hours (5:00-9:00AM and 3:00-6:00 PM) and provides service along Calaveras Boulevard and Milpitas Boulevard adjacent to the project site.

Bus Route 77 provides service between Evergreen Valley College in San Jose and the Weller and Main transit center in Milpitas. This line operates on a 15- to 30-minute headway during commute hours and provides service along Milpitas Boulevard adjacent to the project site.

Express Bus Route 104 provides service between Piedmont Hills in San Jose and Palo Alto. This line operates on a 30-minute headway during commute hours and provides service along Calaveras Boulevard adjacent to the project site.

Existing Intersection Lane Configurations

The existing lane configurations at the study intersections were provided by City staff and confirmed by observations in the field. The existing intersection lane configurations are shown on Figure 4.

Existing Traffic Volumes

Existing peak-hour traffic volumes were obtained from the City of Milpitas and supplemented with manual turn-movement counts at intersections where counts were needed. New 2003 counts were conducted during the AM peak hour. The 2003 counts were used for all study intersections with the exception of Abbott and Calaveras. A 2000 AM count was used for this intersection since the 2000 count was significantly higher than the 2003 count. For the PM peak hour, 2002 counts were used for the 2 CMP intersections. To be conservative, the City of Milpitas requested that 2000 PM counts be used for all non-CMP intersections where available. The reason for using 2000 PM counts is that the 2000 counts are consistently higher than the more recent 2003 PM counts. Where 2000 PM counts were not available, the new 2003 counts were factored up by 7% to represent the higher 2000 volumes. New 2003 counts were conducted during the Saturday peak hour. The City provided 2001 counts for the 2 CMP intersections for the weekday midday peak hour. The existing peak-hour intersection volumes are shown on Figure 5. The traffic count data are included in Appendix A.

Existing Intersection Levels of Service

The results of the level of service analysis under existing conditions are summarized in Table 3. The results show that, measured against the City of Milpitas level of service standards, the intersection of Abbott Avenue and Calaveras Boulevard currently operates at an unacceptable LOS E during the AM peak hour.

Based on the existing intersection level of service analysis, the average delay at the CMP intersection of Milpitas and Calaveras is highest during the weekday midday peak hour of traffic. However, the total existing traffic volumes at this CMP intersection is lower during the midday peak hour than during the PM peak hour. The same holds true for the CMP intersection of Abel and Calaveras. Therefore, no further level of service analysis of the midday peak hour was conducted for these two CMP intersections. According to CMP level of service standards, none of the CMP study intersections currently operate at an unacceptable level of service. The level of service calculation sheets are included in Appendix D.

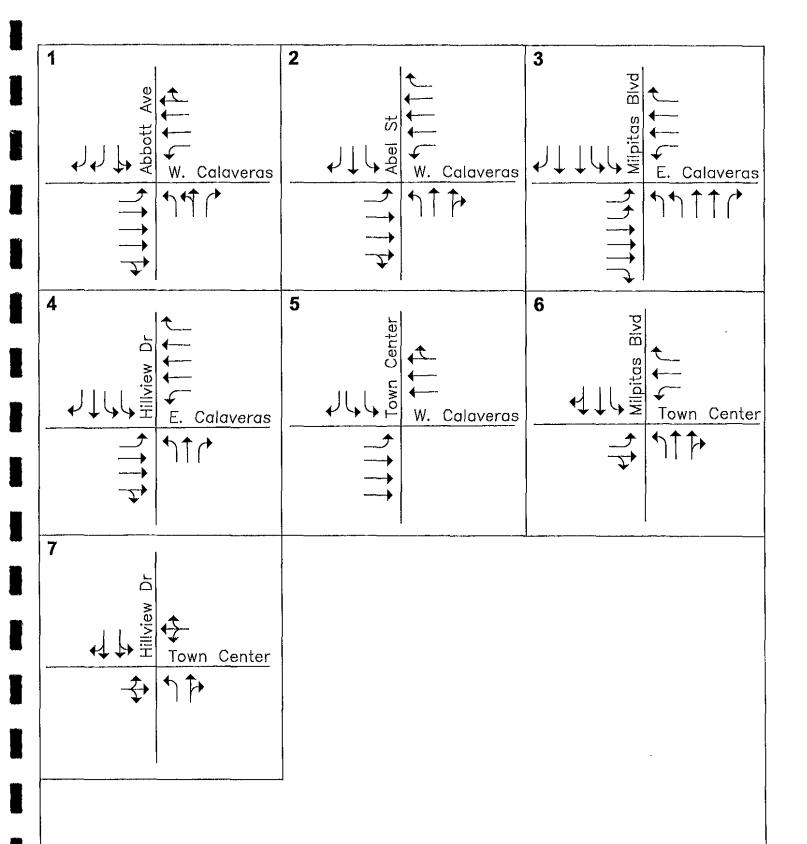


Figure 4

EXISTING LANE CONFIGURATIONS

Hexagon
Transportation Consultants, Inc.

1	2	3
28(140)[162] 28(1475)[2058] 28(1475)[2058] 205(486)[391] 205(486)[391] 205(486)[391] 48(170)[43] 48(170)[43]	$\begin{array}{c} & & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\$	PA B 119(253)[317] [925](325)(92)(116)[1406] 105(13)(92)(93)(137] 105(1475)[436] ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
4	5	6
[901](952) #01	100	43(201)[63] 43(201)[63] 43(30)[40] 43(201)[38] 43(26)[46] 43(201)[38] 43(26)[46] 43(201)[38] 43(26)[46] 43(201)[38] 43(201)[38] 43(201)[38] 43(201)[38] 43(201)[38] 43(30)[64] 43(201)[38] 43(30)[64] 43(201)[38] 43(30)[64] 43(201)[38] 43(30)[64] 43(201)[38] 43(30)[64] 43(201)[38] 43(30)[64] 43(201)[38] 43(30)[40] 43(201)[38] 43(30)[40] 43(201)[38] 43(30)[40] 43(201)[38] 43(30)[40] 43(201)[38] 43(30)[40] 43(30)[30] 43(30)[40] 43(30)[30] 43(30)[40] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30] 43(30)[30]
7 [66](65)(65)(65)(65)(65)(65)(65)(65)(65)(65)		

XX (XX) [SAT] = AM (PM) [SAT] Peak Hour Volumes

Figure 5

EXISTING TRAFFIC VOLUMES

Hexagon
Transportation Consultants, Inc.

Table 3
Existing Intersection Levels of Service

		•	Exis	ting
	Peak	Count	Ave.	
Intersection	Hour	Date	Ave. Delay 63.6 33.6 31.6 45.0 49.8 42.9 41.8 41.4 42.9 38.8 47.3 28.5 34.9 23.9 6.1 9.1 10.5 26.9 28.9	LOS
Abbott Ave and Calaveras Blvd	AM	1/27/2000	63.6	Ë
	ΡM	9/29/1999	33.6	С
	Sat	3/22/2003	31.6	С
Abel St and Calaveras Blvd *	AM	3/20/2003	45.0	D
	PM	10/2002	49.8	D
	Sat	3/22/2003	42.9	D
	Mid	2001	41.8	D
Milpitas Blvd and Calaveras Blvd *	AM	3/20/2003	41.4	D
•	PM	10/2002	42.9	D
	Sat	3/22/2003	38.8	D
	Mid	Date Delay 1/27/2000 63.6 9/29/1999 33.6 3/22/2003 31.6 3/20/2003 45.0 10/2002 49.8 3/22/2003 42.9 2001 41.8 3/20/2003 41.4 10/2002 42.9 3/22/2003 38.8 2001 47.3 3/18/2003 28.5 3/15/2000 34.9 3/22/2003 23.9 3/19/2003 6.1 3/22/2003 9.1 3/22/2003 10.5 3/19/2003 26.9	D	
Hillview Dr and Calaveras Blvd	AM	3/18/2003	28.5	C
	PM	3/15/2000	34.9	С
	Sat	3/22/2003	23.9	C
Town Center Dr and Calaveras Blvd	AM	3/19/2003	6.1 [°]	Α
	PM	3/20/2003	9.1	Α
	Sat	3/22/2003	10.5	В
Milpitas Blvd and Town Center Dr	AM	3/19/2003	26.9	С
•	PM	3/19/2003	28.9	С
	Sat	3/22/2003	34.5	С

^{*} Denotes a CMP intersection.

Existing Signal Warrant

A peak-hour signal warrant analysis (*Caltrans Traffic Manual*, Chapter 9, Warrant 11) was conducted for the unsignalized intersection of Hillview Drive and Town Center Drive to determine whether signalization would be justified on the basis of existing peak-hour volumes. The analysis showed that the peak-hour volume signal warrant is not satisfied under existing conditions at the intersection. The signal warrant analysis sheets are included in Appendix E.

Existing Freeway Levels of Service

Traffic volumes for the study freeway segments were obtained from the 2002 CMP Annual Monitoring Report. The results of the analysis are summarized in Table 4. The results show that three of the freeway segments analyzed currently operate at an unacceptable LOS F during the PM peak hour:

Northbound I-680, between Yosemite Drive and Calaveras Boulevard Northbound I-680, between Calaveras Boulevard and Jacklin Road Northbound I-880, between Great Mall Parkway and Calaveras Boulevard

All other analyzed freeway segments operate at LOS E or better during the AM and PM peak hours.

Table 4
Existing Freeway Level of Service Analysis

						ed-Flow Lane	s	
			Peak	Ave.	# of			
Freeway	Segment	Direction	Hour	Speed/a/	Lanes	Volume/a/	Density	LOS
I-680	Yosemite Drive to Calaveras Blvd	NB	AM	64	4	7,170	28.0	D
			PM	17	4	5,360	78.8	F
I-680	Calaveras Blvd to Jacklin Road	NB	AM	65	3	5,850	30.0	D
			PM	19	3	4,900	86.0	F
I-880	Great Mall Pkwy to Calaveras Blvd	NB	AM	67	3	4,020	20.0	С
	•		PM	12	3	3,920	108.9	F
1-880	Calaveras Blvd to Dixon Landing Rd	NB	AM	66	4	5,940	22.5	С
			PM	54	4	7,970	36.9	D
l-880	Dixon Landing Rd to Calaveras Blvd	SB	АМ	66	4	5,700	21,6	С
	· ·		PM	67	4	4,100	15.3	В
I-880	Calaveras Blvd to Great Mall Pkwy	SB	ΑM	66	3	4,750	24.0	С
	•	•	PM	67	3	3,620	18.0	С
1-680	Jacklin Road to Calaveras Blvd	SB	AM	61	3	6,590	36.0	D
·			PM	62	3	6.510	35.0	D
I-680	Calaveras Blvd to Yosemite Drive	SB	AM	66	4	6,470	24.5	D
			PM	46	4	7,570	41.1	D

/a/ Source: Santa Clara Valley Transportation Authority Congestion Management Program Monitoring Study, 2002.

Observed Existing Traffic Conditions

Traffic conditions in the field were observed in order to identify existing operational deficiencies and to confirm the accuracy of calculated levels of service. Field observations were conducted on a weekday (April 15, 2003) in the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak hours of traffic. Observations also were conducted on a Saturday (April 19, 2003) between 1:00 PM and 3:00 PM, which is considered the peak hour of traffic on a Saturday. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to intersection level of service, (2) to identify any locations where the intersection level of service calculation does not accurately reflect level of service in the field, (3) to identify possible causes of congestion if observed, and (4) to identify any operational deficiencies at intersection locations.

Field observations revealed that the following study intersections have existing operational problems:

Abbott Avenue and Calaveras Boulevard

During the PM peak hour, the eastbound left-turn pocket regularly fills up. However, all vehicles are able to clear the intersection in one signal cycle. On the other hand, when the eastbound left-turn pocket fills up during the Saturday peak hour, the signal does not provide an adequate amount of green time for vehicles to clear the intersection in one signal cycle. In fact, on two occasions during the Saturday field observations the left-turn signal remained green for less than 10 seconds before turning red. Thus, the vehicle extension time may need to be lengthened so that this intersection operates more efficiently during the Saturday peak hour.

Abel Street and Calaveras Boulevard

During the PM peak hour, the westbound left-turn queue frequently extends out of the turn pocket. The green time for the westbound left-turn movement is too short to permit all queued vehicles to clear the intersection in one signal cycle. Eastbound vehicles on Calaveras Boulevard periodically stack up back to Serra Way because of the heavy eastbound traffic volumes during the PM peak hour, although the eastbound left-turn pocket is not affected.

Milpitas Boulevard and Calaveras Boulevard

The westbound traffic on Calaveras Boulevard occasionally backs up past Town Center Drive to Hillview Drive due to heavy AM peak hour volumes. When this occurs, two signal cycles are usually required to clear the intersection of Milpitas/Calaveras. Moreover, the intersection of Town Center/Calaveras is ocassionally blocked due to the heavy westbound traffic volumes during the AM peak hour.

During the PM peak hour, the eastbound left-turn queue frequently fills the turn pocket but does not spill out of the pocket. However, while the eastbound left-turn pocket has adequate storage capacity, the green time for this left-turn movement is too short to permit all queued vehicles to clear the intersection in one signal cycle.

Hillview Drive and Calaveras Boulevard

In general, westbound traffic on Calaveras is very heavy during the AM period. The westbound left-turn queue frequently extends out of the turn pocket, occasionally blocking the inside through lane during the AM peak hour. Conversely, the inside through movement occasionally backs up and prohibits vehicles from entering the left-turn pocket. The westbound vehicles at this intersection occasionally stack up back to the southbound I-680 off-ramp, which results in a short and momentary back up on the off-ramp. The backup on Calaveras makes it difficult for vehicles exiting the freeway to merge out of the exclusive right-turn lane and onto Calaveras. It is nearly impossible for vehicles exiting the freeway to get all the way over to the westbound left-turn lane of this intersection.

Traffic on Calaveras Boulevard is heavy in the eastbound direction toward the I-680 interchange during the PM peak hour. The eastbound vehicles at this intersection occasionally stack up back to Town Center Drive due to the high volume of vehicles wanting to get onto I-680.

The eastbound and westbound traffic on Calaveras Boulevard during the Saturday peak is more or less balanced. While no unusual problems were observed during the Saturday peak hour of traffic, the westbound vehicles at the intersection of Hillview and Calaveras occasionally stack up back to the southbound I-680 off-ramp. The backup, however, did not adversely affect the operation of the southbound I-680 off-ramp.

3. Background Conditions

This chapter describes background traffic conditions. Background conditions are defined as conditions just prior to completion of the proposed development. Traffic volumes for background conditions comprise volumes from existing traffic counts plus traffic generated by other approved developments in the vicinity of the site. It is assumed in this analysis that the transportation network under background conditions would be the same as the existing transportation network. This chapter describes the procedure used to determine background traffic volumes and the resulting traffic conditions.

Background Traffic Volumes

Background peak-hour traffic volumes were calculated by adding to existing volumes the estimated traffic from approved but not yet constructed developments. The added traffic from approved but not yet constructed developments were provided by the City in the form of the Approved Trips Inventory (ATI). Background traffic volumes are shown on Figure 6. The ATI are included in Appendix B.

Background Intersection Levels of Service

The results of the intersection level of service analysis under background conditions are summarized in Table 5. The results show that, measured against the City of Milpitas level of service standards, the intersection of Abbott Avenue and Calaveras Boulevard would operate at an unacceptable LOS E under background conditions during the AM peak hour.

According to CMP level of service standards, none of the CMP study intersections would operate at an unacceptable level of service under background conditions. The level of service calculation sheets are included in Appendix D.

1	2	3
28(140)[162] 28(140)[162] 28(181)[2058] 205(181)[2058] 205(181)[2058] 205(181)[2058] 48(170)[43] 205(181)[2058] 48(170)[43] 48(170)[43] 48(170)[43]	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PA B 119(253)[317] 2421(1147)[1406] 125(92)[137] 125(92)[137] 168(504)[436] ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
4	5	6
[901](\$92)(242] 		43(70)[63] 43(70)[63] 43(20)[10] 43(201)[160] 43(201)[160] 43(201)[160] 7(71)[134] 7(71)[134] 43(70)[63] Town Center (125(2)(25)(25)(25)(25)(25)(25)(25)(25)(25
7 (681)(69)(2) (70)(0)(1) (10)(0)(1) (10)(0)(1) (10)(0)(1) (10)(0)(1) (10)(0)(0)(1) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0)(0)(0) (10)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0		

XX (XX) [SAT] = AM (PM) [SAT] Peak Hour Volumes

Figure 6

BACKGROUND TRAFFIC VOLUMES

Hexagon
Transportation Consultants, Inc.

Table 5
Background Intersection Levels of Service

			Exis	ling	Backg	round
	Peak	Count	Ave.		Ave.	
Intersection	Hour	Date	Delay	LOS	Delay	LOS
Abbott Ave and Calaveras Blvd	AM	1/27/2000	63.6	E	77.2	E
	PM	9/29/1999	33.6	С	33.7	С
	Sat	3/22/2003	31.6	С	31.6	С
Abel St and Calaveras Blvd *	AM	3/20/2003	45.0	D	50.5	D
	PM	10/2002	49.8	D	53.2	D
	Sat	3/22/2003	42.9	D	42.9	D
	Mid	2001	41.8	D	42.8	Ð
Milpitas Blvd and Calaveras Blvd *	AM	3/20/2003	41.4	D	47.2	D
	PM	10/2002	42.9	D	43.1	D
	Sat	3/22/2003	38.8	D	38.8	D
	Mid	2001	47.3	D	47.4	D
Hillview Dr and Calaveras Blvd	AM	3/18/2003	28.5	С	28.3	С
	PM	3/15/2000	34.9	С	35.0	D
	Sat	3/22/2003	23.9	С	23.9	С
Town Center Dr and Calaveras Blvd	AM	3/19/2003	6.1	Α	6.3	Α
	PM	3/20/2003	9.1	Α	9.0	Α
	Sat	3/22/2003	10.5	В	10.5	В
Milpitas Blvd and Town Center Dr	AM	3/19/2003	26.9	С	26.9	С
	PM	3/19/2003	28.9	С	28.9	С
	Sat	3/22/2003	34.5	С	34.5	C

^{*} Denotes a CMP intersection.

4. Project Impacts and Mitigation Measures

This chapter describes project traffic conditions, significant project impacts, and measures that are recommended to mitigate project impacts. Included are descriptions of the significance criteria that define an impact, estimates of project-generated traffic, identification of the impacts, and descriptions of the mitigation measures. Project conditions are represented by background traffic conditions with the addition of traffic generated by the project.

Significant Impact Criteria

Significance criteria are used to establish what constitutes an impact. For this analysis there are three sets of relevant criteria for impacts on intersections and freeways. These are based on: (1) the City of Milpitas intersection Level of Service standards, (2) the CMP intersection Level of Service standards, and (3) the CMP Freeway LOS standards. Project impacts on other transportation facilities, such as bicycle and transit facilities, were determined on the basis of engineering judgment.

City of Milpitas Definition of Significant Intersection Impacts

The project is said to create a significant adverse impact on traffic conditions at a signalized intersection in the City of Milpitas if for either peak hour:

- 1. The level of service at the intersection degrades from an acceptable LOS D or better under background conditions to an unacceptable LOS E or F under project conditions, or
- 2. The level of service at the intersection is an unacceptable LOS E or F under background conditions <u>and</u> the addition of project trips causes both the critical-movement delay at the intersection to increase by four or more seconds and the demand-to-capacity ratio (V/C) to increase by .01 or more.

An exception to this rule applies when the addition of project traffic reduces the amount of average stopped delay for critical movements (i.e. the change in average stopped delay for critical movements is negative). In this case, the threshold of significance is an increase in the critical V/C value by .01 or more.

A significant impact by City of Milpitas standards is said to be satisfactorily mitigated when measures are implemented that would restore intersection level of service to background conditions or better.

CMP Definition of Significant Intersection Impacts

The definition of a significant impact at a CMP intersection is the same as for the City of Milpitas, except that the CMP standard for acceptable level of service at a CMP intersection is LOS E or better. A significant impact by CMP standards is said to be satisfactorily mitigated when measures are implemented that would restore intersection conditions to background conditions or better.

CMP Definition of Significant Freeway Segment Impacts

A project is said to create a significant adverse impact on traffic conditions on a CMP freeway segment if for either peak-hour:

- 1. The level of service on the freeway segment is an unacceptable LOS F under project conditions, and
- 2. The number of project trips on that segment constitutes at least one percent of capacity on that segment.

A significant impact by CMP standards is said to be satisfactorily mitigated when measures are implemented that would restore freeway conditions to better than background conditions.

Transportation Network Under Project Conditions

It is assumed in this analysis that the transportation network under project conditions would be the same as described under existing conditions.

Project Trip Estimates

The magnitude of traffic produced by a new development and the locations where that traffic would appear are estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In determining project trip generation, the magnitude of traffic entering and exiting the site is estimated for the AM, PM and Saturday peak hours. As part of the project trip distribution, an estimate is made of the directions to and from which the project trips would travel. In the project trip assignment, the project trips are assigned to specific streets and intersections. These procedures are described further in the following sections.

Trip Generation

Through empirical research, data have been collected that correlate to common land uses their propensity for producing traffic. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. The magnitude of traffic added to the roadway system by a particular development is estimated by multiplying the applicable trip generation rates to the size of the development. The daily, AM, PM and Saturday standard trip generation rates applied to the shopping center and supermarket were based on those contained in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 6th edition. The Saturday trip rates applied to the townhouse development portion of the site also were based on ITE trip rates. At the request of the City of Milpitas, the daily, AM, and PM standard trip generation rates used for the proposed townhouse development were based on those recommended by the San Diego Association of Governments (SANDAG). These rates were used since they are generally higher than the ITE rates. Thus, the SANDAG trip generation rates represent a more conservative approach than the ITE rates. The project trip generation estimates are presented in Table 6.

Based on the corresponding recommended daily trip generation rates shown in Table 6, it is estimated that the proposed redevelopment of the Milpitas Town Center would generate 3,668 new daily trips, with 191 new trips during the AM peak hour, 362 new trips during the PM peak hour, and 335 new trips during the Saturday peak hour. Using the specified inbound/outbound splits, the project would produce an increase of 100 inbound and 91 outbound trips during the AM peak hour, 185 inbound and 177 outbound trips during the PM peak hour, and 169 inbound and 166 outbound trips during the Saturday peak hour.

Trip Distribution

The trip distribution pattern for the proposed project was estimated based on existing travel patterns on the surrounding roadway system and the locations of complementary land uses. The trip distribution pattern for the proposed townhouse development is shown graphically on Figure 7. The trip distribution pattern for the proposed supermarket is shown graphically on Figure 8.

Trip Assignment

The peak-hour trips generated by the proposed development were assigned to the roadway system in accordance with the trip distribution pattern discussed above. Figure 9 shows the project trip assignment.

Project Traffic Volumes

Project trips, as represented in the above project trip assignment, were added to background traffic volumes to obtain background plus project traffic volumes. Background traffic volumes plus project trips are typically referred to simply as *project traffic volumes*; this is contrasted with the term *project trips*, which is used to signify the traffic that is produced specifically by the project. The project traffic volumes are shown graphically on Figure 10. Traffic volumes for all components of traffic are tabulated in Appendix C.

Table 6
Trip Generation Estimates for the Milpitas Town Center

		AM Po					AM Peak Hour PM Peak Hour						SAT		Midday Peak Hour					
			Daily	Daily	Peak Hour				Peak Hour				Peak Hour				Peak Hour			
Land Use	Size		Rate	Trips	Rate /a/	In	Out	Total	Rate /a/	in	Out	Total	Rate /a/	ln	Out	Total	Rate /e/	In	Out	Total
Existing Uses																				
Shopping Center /b/	281,925	s.f.	47	13,274	1.05	181	116	296	4.41	597	647	1,245	6.07	890	822	1,712	5.30	747	746	1,493
Proposed Use																				
Shopping Center /c/	192,925	s.f.	54	10,401	1.23	144	92	236	5.02	465	504	969	6.93	696	642	1,338	6.03	582	581	1,163
Supermarket	54,000	s.f.	112	6,022	3.87	127	82	209	10.84	281	304	585	12.01	331	318	649	13.01	351	351	702
Townhomes /d/	์ 65 เ	units	8	520	0.64	8	33	42	0.80	36	16	52	0.94	33	28	61	0.48	10	10	20
Total				16,943		280	207	487		782	824	1,606		1,060	988	2,048		943	942	1,885
Net Trips Generated				3,668		100	91	191		185	177	362		169	166	335		196	196	392

[/]a/ Rates based on ITE Trip Generation Manual, 6th edition, average rates and regression equation (except AM and PM peak hour for Townhome portion of site).

[/]b/ Trip generation estimates for the shopping center include the 35,000 s.f. movie theater.

[/]c/ Trip generation estimates based on the total shopping center size minus the supermarket.

[/]d/ Residential AM and PM trip generation rates based on SANDAG rates for multi-family dwellings (6-20 du/acre). Saturday based on ITE rates.

[/]e/ Shopping Center and Supermarket midday peak our trips based on a midday to PM peak hour ratio of parking demand from *Parking* by Robert A. Weant and Herbert S. Levinson, 1990. Residential midday peak hour trips calculated based on 60% of PM peak hour trips.

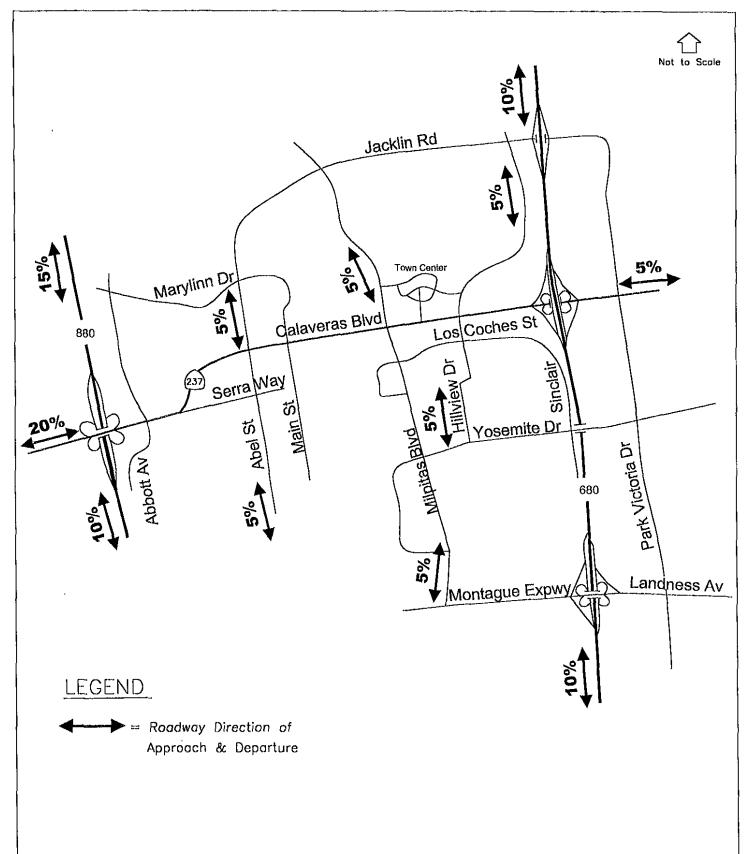
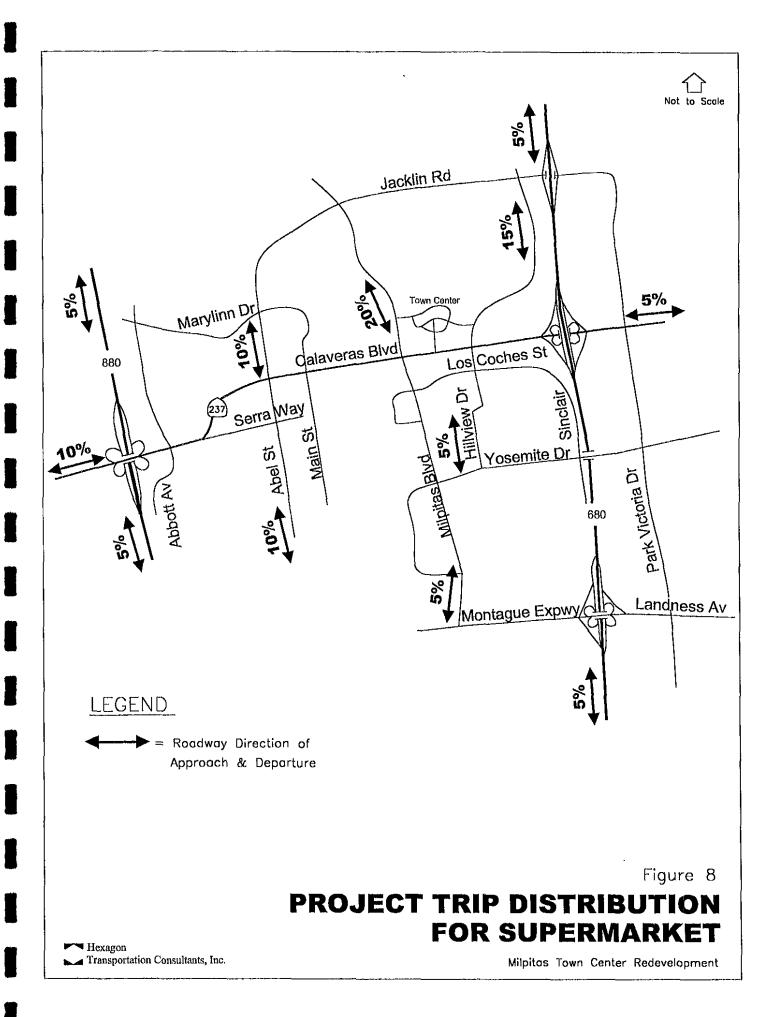


Figure 7

PROJECT TRIP DISTRIBUTION FOR TOWNHOMES

Hexagon
Transportation Consultants, Inc.



1	1	2		3	1
	⊕ Atto ←30(41)[41] W. Calaveras 25(48)[43]→		E		PAB solid!W 5
4	[81](61)21 	5	12(21)[19] L. Calaveras 27(46)[41]	6	Signal Center (35)[37] Vilaitas Center Ce
7	Town Center 12(25)[23] 12(19)[18] 12(19)[18] 12(19)[18] 12(19)[18] 12(19)[18]				

XX (XX) [SAT] = AM (PM) [SAT] Peak Hour Volumes

Figure 9

PROJECT TRIP ASSIGNMENT

1	2	3
28(140)[162] 28(140)[162] 28(188)[391] 48(170)[43] 48(170)[43] 206(488)[391] 48(170)[43] 48(170)[43]	52 (144)[117] 62(144)[117] 62(144)[117] 62(60(1659)[1633] 62(1659)[1633] 62(1659)[1633] 62(1659)[1633] 62(1659)[1633] 62(1659)[1633] 62(1659)[1633] 62(1659)[1633] 62(1659)[1633] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117] 62(144)[117	PAIR SD110 119(253)[317] [55] [65] [65] 2445(1185)[1442] 2445(1185)[1442] 128(96)[142] 128(96)[142] 128(2274)[466] ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
4	5	6
[90] [49] [256(280)[261] [84] [69) [69] [49] [1624] [84] [69) [69] [49] [1624] [85] [125] [49] [49] [49] [49] [49] [49] [49] [49	105(143)[150] 105(143)[15	43(201)[160] 43(201)[160] 43(201)[160] 43(201)[160] 76(71)[134] 76(71)[134]
7 [661](4)(4)(2)(0)(0)(1) [661](4)(4)(4)(4)(6)(1) [661](6)(1)(1)(1)(1)(1) 23(70)(58)(1)(1)(1)(1)(1)(1) 23(300)(500)(1)(1)(1)(1)(1) 23(300)(500)(1)(1)(1)(1)(1) 49(223)(206)(1)(1)(1)(1)(1) 49(223)(206)(1)(1)(1)(1)(1)(1)(1) 49(223)(206)(1)(1)(1)(1)(1)(1)(1)(1) 49(223)(206)(1)(1)(1)(1)(1)(1)(1)(1)(1) 49(223)(206)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1) 49(223)(206)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)		

XX (XX) [SAT] = AM (PM) [SAT] Peak Hour Volumes

Figure 10

BACKGROUND PLUS PROJECT TRAFFIC VOLUMES

Hexagon
Transportation Consultants, Inc.

Milpitas Town Center Redevelopment

Project Intersection Analysis

Level of Service Analysis

Measured against the City of Milpitas and CMP level of service impact criteria, none of the signalized study intersections would be significantly impacted by the project. The results of the level of service analysis under project conditions are summarized in Table 7. The level of service calculation sheets are contained in Appendix D.

Table 7
Project Intersection Levels of Service

		Background		Project			
	Peak	Ave.		Ave.		Incr. In	Incr. In
Intersection	Hour	Delay	LOS	Delay	Los	Crit. Delay	Crit. V/C
Abbott Ave and Calaveras Blvd	AM	77.2	Ε	78.9	Ε	2.5	0.01
	PM	33.7	С	33.8	С	0.1	0.01
	Sat	31.6	С	31.7	С	0.2	0.01
Abel St and Calaveras Blvd *	` AM	50.5	D	51.5	D	1.3	0.01
	PM	53.2	D	57.4	Ε	6.5	0.03
	Sat	42.9	D	43.8	D	1.6	0.03
	Mid	42.8	D	44.5	D	2.0	0.03
Milpitas Blvd and Calaveras Blvd *	AM	47.2	D	49.5	D	3.3	0.01
Miliphas Bivo and Calaveras Bivo	PM	43.1	D	43.8	D	0.5	0.01
	Sat	38.8	D	39.4	D	0.9	0.02
	Mid	47.4	D	48.1	D	1.2	0.02
Hillview Dr and Calaveras Blvd	AM	28.3	С	28.3	С	0.0	0.00
	PM	35.0	D	35.4	D	8.0	0.01
	Sat	23.9	С	24.3	С	0.6	0.01
Town Center Dr and Calaveras Blvd	AM	6.3	Α	7.7	Α	1.5	0.02
	PM	9.0	Α	10.8	В	0.5	0.01
	Sat	10.5	В	12.7	В	3.3	0.03
Milpitas Blvd and Town Center Dr	AM	26.9	С	27.7	С	1.1	0.01
	PM	28.9	С	30.0	С	2.9	0.06
	Sat	34.5	С	33.2	С	1.0	0.02

^{*} Denotes a CMP intersection.

Other Transportation Issues

Hillview Drive/Town Center Driveway Operational Issues

Currently during the midday and PM peak hours of traffic, a vehicle queue occasionally develops on the north leg of the intersection of Hillview Drive/Calaveras Boulevard. At times the queue extends back past the Hillview/Town Center driveway, thereby blocking the left turns into and out of the driveway. When

the northbound left-turns into the driveway are blocked the northbound left-turn vehicle queue could extend out of the pocket, thus blocking northbound through traffic on Hillview Drive, although this phenomenon did not occur during our observations. This situation could potentially affect the operations at the intersection of Hillview Drive/Calaveras Boulevard. Project traffic would add to this potential operational problem.

Improvement Alternative 1 - Full Access Unsignalized Driveway

In order to remediate this operational problem, the inside southbound left-turn lane at the intersection of Hillview Drive/Calaveras Boulevard could be extended back to the Town Center driveway location in order to provide additional queuing storage. This improvement is feasible if the northbound movement of the north leg of the intersection is reconfigured as shown in Figure 12. (Figure 11 shows the existing configuration for comparison purposes.) This improvement would substantially reduce the likelihood that the project driveway would be blocked by a queue of vehicles.

Improvement Alternative 2 – Limited Access Unsignalized Driveway

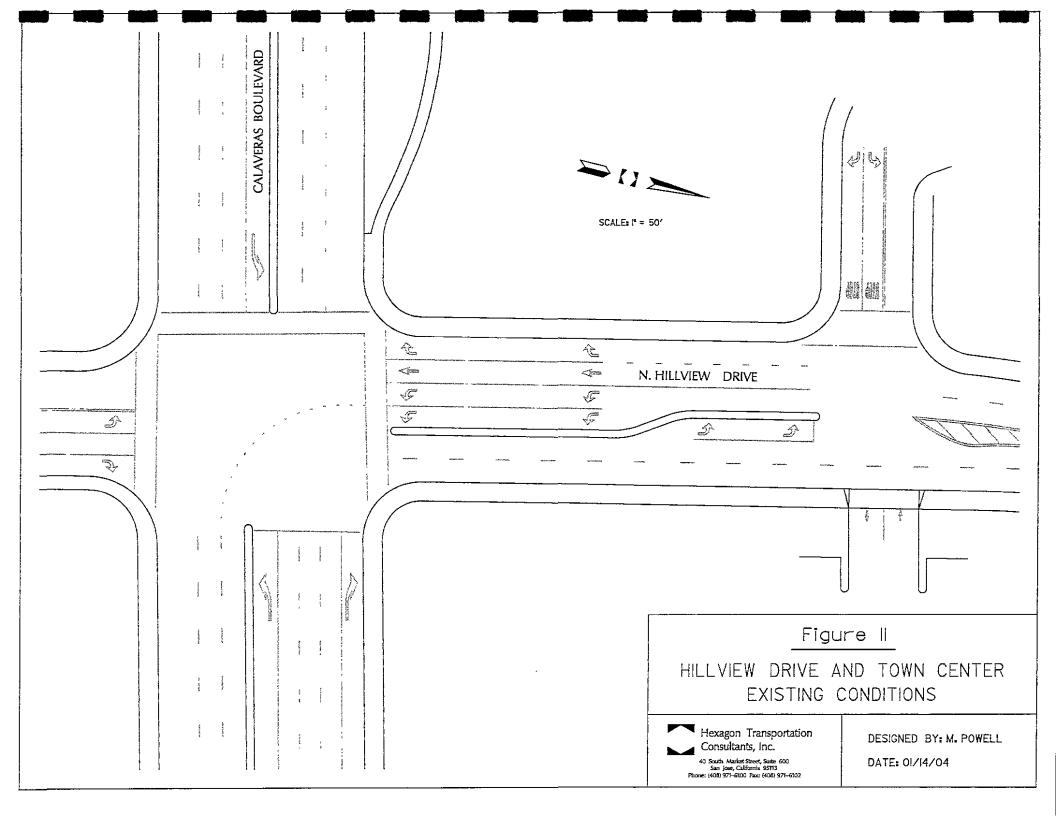
The Hillview/Town Center driveway could be designated right in/right out only, and a raised median could be installed on Hillview Drive to prohibit left turns into and out of the Town Center driveway. Left turns out of the Lyons Restaurant driveway would need to be accommodated with appropriate median design to implement this improvement alternative.

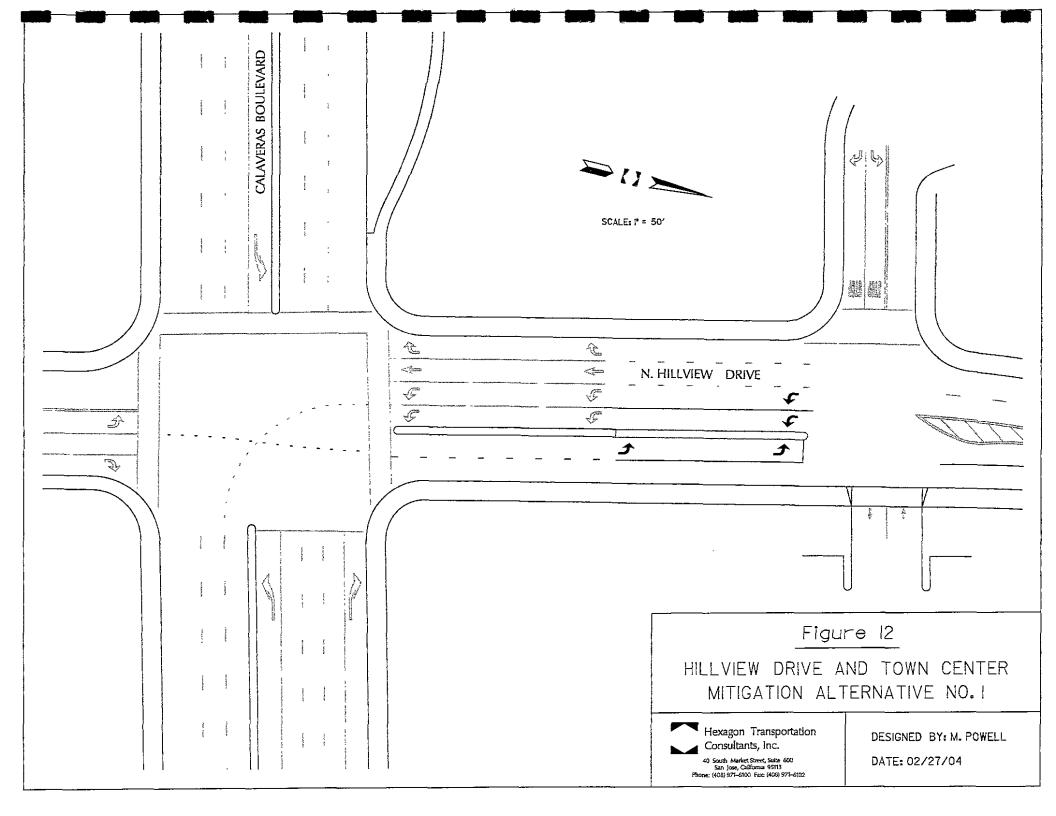
Hillview Drive and Town Center Driveway Unsignalized Intersection Level of Service

The unsignalized intersection of Hillview Drive and Town Center Driveway was analyzed for level of service under project conditions based on 4 possible access alternatives. A description of each driveway access alternative and the corresponding levels of service for the worst movement are shown below.

		Worst M	ovement
Description of Hillview Drive/Town Center Driveway Access	Peak Hour	Ave. Delay	LOS
Alternative 1 - Full Access @ Town Center DW	AM	20.2	С
	PM	39.6	E
	Sat	25.1	С
Alternative 2 - Limited Access (No LT into or out of Town Center DW)	AM	12.6	В
	PM	14.2	В
	Sat	12.6	В
Alternative 4a - New RT Lane on Calaveras + Full Access @ Town Center DW	AM	17.9	С
·	PM	22.3	С
	Sat	17.0	С
Alternative 4b - New RT Lane on Calaveras + No LT into Town Center DW	AM	14.1	В
	PM	14.2	В
	Sat	12.6	В

The level of service calculation sheets are contained in Appendix D.





Improvement Alternative 3 – Signalized Driveway

Signal Warrant Analysis

A peak-hour signal warrant check (*Caltrans Traffic Manual*, Chapter 9, Warrant 11) was performed at the unsignalized intersection of Hillview Drive and Town Center Drive to determine whether signalization would be justified on the basis of project peak hour volumes. The analysis revealed that this unsignalized intersection would not meet the Caltrans peak hour volume warrant during the AM, PM or Saturday peak hours of traffic and, therefore, would not warrant signalization under project conditions. The signal warrant sheets are included in Appendix E

Although the intersection of Hillview Drive and Town Center Drive would not warrant signalization based on the Caltrans peak-hour volume warrant, additional traffic analysis was performed at this location to see if a signal would in fact be feasible during the AM and PM peak hours of traffic. A detailed traffic simulation model was developed to determine whether or not the intersection would function properly and efficiently if signalized. The results of the traffic signal analysis are described below.

Simulation Model Description

The analysis was conducted using the Synchro 5 and Sim Traffic software packages. Synchro 5 is used to model and optimize traffic signal timings, and employs the 2000 Highway Capacity Manual methodology for level of service analyses at signalized and unsignalized intersections. SimTraffic is a microscopic traffic simulation software package that utilizes input and output data from Synchro 5 to simulate traffic conditions on roadway networks.

The potential signal at Hillview Drive and Town Center Drive would be coordinated with the adjacent signal at Hillview Drive and Calaveras Boulevard. The simulation analysis demonstrated that with the current intersection configuration, the northbound left-turn vehicle queue occasionally would extend to Calaveras Boulevard during the PM peak hour, but would not adversely affect operations at that intersection. The simulation model showed that once the queue reached Calaveras Boulevard, traffic began to flow and all queued vehicles were able to clear the intersection of Hillview Drive and Town Center Drive in one signal cycle.

The traffic simulation showed that a signal at the intersection of Hillview Drive and Town Center Drive would effectively serve the projected AM and PM peak hour traffic volumes and would operate efficiently.

Improvement Alternative 4 – New Driveway on Calaveras Boulevard

A new inbound only driveway with access off of westbound Calaveras Boulevard could be constructed at some location between the Calaveras/Hillview and Calaveras/Town Center intersections. The new driveway could be utilized by inbound traffic in conjunction with the Hillview/Town Center driveway. In this case, the new driveway would reduce the number of vehicles entering the shopping center at the full access Hillview/Town Center driveway. The new inbound driveway also could replace the northbound left-turn access at the Hillview/Town Center driveway, thus receiving all of the inbound traffic that would have used the northbound left-turn lane at Hillview/Town Center driveway.

Recommendation

Once the proposed Milpitas Town Center redevelopment project is complete, the unsignalized intersection operations of Hillview Drive and Town Center Drive should be closely monitored. Should the intersection experience operational problems, one of the improvement alternatives described above should be implemented.

Intersection Operations Analysis

The analysis of project intersection level of service was supplemented with an analysis of intersection operations for selected signalized intersections (see Table 8 below).

Table 8
Project Queuing and Turn Pocket Storage Analysis

Intersection	Mvmt.	Peak Hour	Planned # Lanes	Planned Storage Per Lane (ft.)	Vehicle Queue /a/	Req. Storage Per Lane (ft.) /b/	Comment
Abel and Calaveras	SBL	AM	1	275	6	150	Adequate Storage
		PM	1	275	9	225	Adequate Storage
		Sat	1	275	8	200	Adequate Storage
	WBL	AM	1	325	14	350	Inadequate Storage, /c/
		PM	1	325	15	375	Inadequate Storage, /c/
		Sat	1	325	18	450	Inadequate Storage, /c/
Milpitas and Calaveras	EBL	AM	2	500	14	175	Adequate Storage
		PΜ	2	500	3 5	450	Adequate Storage, /d/
		Sat	2	500	31	400	Adequate Storage, /d/
Hillview and Calaveras	SBL	AM	2	175	13	175	Adequate Storage, /d/
		PM	2	175	20	250	Inadequate Storage, /e/
		Sat	2	175	18	225	Inadequate Storage, /e/
Town Center and Calaveras	SBL	AM	2	150	4	50	Adequate Storage
		ΡM	2	150	11	150	Adequate Storage, /d/
		Sat	2	150	11	150	Adequate Storage, /d/
	EBL.	AM	1	420	5	125	Adequate Storage
		PM	1	420	11	275	Adequate Storage
		Sat	1	420	11	275	Adequate Storage
Milpitas and Town Center	SBL	AM	1	115	5	125	Inadequate Storage, /f/
		PM	1	115	6	150	Inadequate Storage, /f/
		Sat	1	115	6	150	Inadequate Storage, /f/
	WBL	AM	1	350	5	125	Adequate Storage
		PΜ	1	350	5	125	Adequate Storage
		Sat	1	350	5	125	Adequate Storage

[/]a/ Design queue calculated by TRAFFIX (# of vehicles).

[/]b/ Required storage is calculated based on TRAFFIX output as follows: Design Veh. Queue x Ave length of veh. (25')/# lanes.

[/]c/ Add a second WB left-turn pocket, which would provide a total of approximately 650 feet of queuing storage.

[/]d/ Vehicle queue length shown has been rounded up to the nearest factor of 25.

[/]e/ Extend the inside SB left-turn lane back to the Hillview/Town Center driveway.

[/]f/ Extend the SB left-turn pocket by 35 feet to provide a total of 150 of vehicle storage.

The operations analysis is based on vehicle queuing for high-demand turning movements at intersections where the project would add traffic. The basis of the analysis is as follows: (1) the TRAFFIX intersection analysis software is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the existing available storage capacity for the movement. This analysis thus provides a basis for estimating future storage requirements at intersections.

The analysis indicated that the estimated maximum vehicle queues for some of the high-demand left-turn movements would exceed the existing vehicle storage capacity under project conditions. The following intersections would have inadequate storage capacity under project conditions.

Abel Street & Calaveras Boulevard – WB left-turn movement (AM, PM and Sat peak hours)

The westbound left-turn movement currently has one left-turn lane with approximately 325 feet of queuing storage. Under background conditions, the movement would require 450 feet of queuing storage during the Saturday peak hour. The project would add 15 trips to the westbound left-turn movement during the Saturday peak hour, thereby increasing the 95th percentile queuing demand by one vehicle. Adding a second westbound left-turn lane would improve the intersection operations at this location by providing a total of approximately 650 feet of queuing storage, which is more than the 450 feet of storage that would be required under project conditions.

Milpitas Boulevard & Town Center Drive – SB left-turn movement (AM, PM and Sat peak hours)

The southbound left-turn movement currently has one left-turn lane with approximately 115 feet of queuing storage. Under background conditions, the movement would require 100 feet of queuing storage during the PM peak hour. The project would add 41 trips to the southbound left-turn movement during the PM peak hour, thereby increasing the 95th percentile queuing demand by two vehicles (50 feet). Extending the southbound left-turn pocket by approximately 35 feet in order to provide the 150 feet of queuing storage that would be necessary under project conditions would improve the overall operations at this intersection. Median landscaping would need to be removed in order to extend the turn pocket. City of Milpitas staff should decide whether they want to pursue this potential improvement.

Project Freeway Segment Analysis

Project traffic volumes on freeway segments were calculated by adding to existing freeway volumes the estimated project trips on freeway segments. The results of the analysis are summarized in Table 9. The results show that three of the freeway segments analyzed would operate at an unacceptable LOS F during the PM peak hour under project conditions. However, none of the segments would be impacted by the project according to the CMP definition of freeway impacts. All other analyzed freeway segments would operate at an acceptable LOS E or better during the AM and PM peak hours.

Site Access, On-Site Circulation and Parking

The proposed site plan was evaluated for site access, on-site circulation, and parking.

Table 9
Project Freeway Segment Level of Service Analysis

						Existing +	Project T	rips	Projec	ct Trips	
			Peak	Ave.	# of	Mixed Flow				%	
Freewa	y Segment	Direction	Hour	Speed/a/	Lanes	Volume/a/	Density	LOS	Volume	Capacity	Impact?
1-680	Yosemite Drive to Calaveras Blvd	NB	AM	64	4	7,176	28.0	D	6	0.1%	NO
1 000	1000mmb Diffo to Galactica Diff		PM	17	4	5,371	79.0	F	11	0.1%	NO
1-680	Calaveras Bivd to Jacklin Road	NB	AM	65	3	5,857	30.0	D	7	0.1%	NO
. 555			PM	19	3	4,910	86.1	F	10	0.1%	NO
1-880	Great Mall Pkwy to Calaveras Blvd	NB	ΑM	67	3	4,026	20.0	С	6	0.1%	NO
			PM	12	3	3,931	109.2	F	11	0.2%	NO
1-880	Calaveras Blvd to Dixon Landing Rd	NB	AM	66	4	5,949	22.5	С	9	0.1%	NO
	•		PM	54	4	7,981	36.9	D	11	0.1%	NO
1-880	Dixon Landing Rd to Calaveras Blvd	SB	AM	66	4	5,707	21.6	С	7	0.1%	NO
. 000		-	PM	67	4	4,113	15.3	В	13	0.2%	NO
J-880	Calaveras Blvd to Great Mall Pkwy	SB	ΑM	66 -	3	4,757	24.0	D	7	0.1%	NO
, , , ,	•		PM	67	3	3,630	18.1	С	10	0.1%	NO
1-680	Jacklin Road to Calaveras Blvd	SB	ΑM	61	3	6,596	36.0	D	6	0.1%	NO
			PM	62	3-	6,521	35.1	D	11	0.2%	NO
1-680	Calaveras Blvd to Yosemite Drive	SB	AM	66	4	6,477	24.5	D	7	0.1%	NO
	2		PM	46	4	7,580	41.2	D	10	0.1%	NO

Overall Site Access

The proposed site plan shows that the three existing full-access driveways will continue to provide access to the site. One signalized driveway is located on Milpitas Boulevard, another signalized driveway is located on Calaveras Boulevard, and one unsignalized driveway is located on Hillview Drive. These driveways would be sufficient to serve the estimated project traffic. The majority of traffic generated by the townhouse development would use either the Milpitas/Town Center or the Hillview/Town Center driveways. Project traffic generated by the shopping center and supermarket would be distributed more evenly between the three access driveways.

Truck Access

An analysis was conducted to determine the adequacy of driveway access and on-site circulation for two categories of large trucks with varying turning radii. The truck categories included in the analysis were truck types WB 40, which represents semi-trailer trucks, and SU 30, which includes small buses, garbage and other single unit trucks. Based on the analysis, all three of the main driveways provide sufficient dimensions for ingress and egress of delivery trucks.

On-Site Circulation

Townhouse Circulation

The on-site circulation was reviewed in accordance with generally accepted traffic engineering standards. Based on the current site plan, the "ring road" that circles the townhouse development is at least 25 feet wide and would allow for efficient vehicular circulation around the townhouse development. Guest parking spaces would be located along the ring road, as would the trash dumpsters. Based on an analysis of on-site circulation for truck type SU30, the large turning radii on the ring road would make it easy for garbage trucks to maneuver around the townhouse development.

The site plan shows that there are four dead-end drive aisles within the proposed townhouse development. These drive aisles are approximately 25 feet wide. Dead-end aisles are generally undesirable from a circulation perspective because upon entering, drivers may discover that there is no available parking and, therefore, must either back out or perform a three-point turn. However, from a residential planning standpoint, dead-end aisles are often desirable. Most residents would rather live on a cul-du-sac than along a through street because of the lower traffic volumes. All four dead-end aisles would provide direct access to private townhouse garages and would contain no guest parking spaces. In areas such as these where private garages and driveways are designated to specific individuals, dead-end aisles are not problematic. Drive aisles should be designed to meet City of Milpitas standards, which accommodate passenger vehicles as well as emergency vehicles.

The site plan shows good pedestrian circulation within the townhouse development. Pedestrians easily can access the shopping center, including the surrounding roadways and bus stops via the adjacent sidewalks. A gazebo and observation deck is proposed as part of the project along Berryessa Creek. The City is proposing to build a pedestrian bridge across the creek at this location, thereby connecting the adjacent neighborhood and Peter D. Gill Memorial Park.

Shopping Center/Supermarket Circulation

The proposed revisions to the shopping center would result in very few changes to vehicular circulation on-site. The townhouse development would eliminate the existing northernmost parking field. Thus, on-site circulation would occur exclusively on the roads and within the parking aisles south of the renovated shopping center buildings. The areas south of the renovated buildings would remain virtually unchanged.

Supermarket delivery trucks would enter the site via the intersection of Milpitas Boulevard/Town Center Drive and proceed to the truck loading dock, which is located in the rear of the supermarket less than 700 feet from the intersection. The loading dock area consists of a one-way drive aisle and is relatively isolated from other traffic on-site, thereby minimizing conflicts with other vehicles. An analysis was conducted to determine the adequacy of on-site circulation for truck type WB 40, which represents semi-trailer delivery trucks. Based on the analysis, the loading dock area would provide sufficient space for supermarket delivery trucks to maneuver.

Currently, the shopping center contains very few pedestrian paths. According to the site plan, new pedestrian paths and crosswalks are proposed throughout the site. The new facilities would greatly improve pedestrian circulation and safety, and would attract walking trips to and from the proposed townhouse development. Overall, the site plan shows good pedestrian circulation within the shopping center and surrounding buildings on-site.

Parking Analysis

Townhouse Parking Requirements

Parking for the proposed townhouse development will be provided on-site via private garages and uncovered parking spaces along the outer ring road. It is assumed that parking will be limited to residents and guests only. The project proponent should comply with the City of Milpitas parking standards for very high-density multi-family districts (R4). The City of Milpitas Zoning Ordinance 8.06-1 states that a high-density development requires the following number of parking spaces:

- 4. Two (2) or more bedrooms: two (2) covered automobile stalls per unit required.
- 5. Guest parking: fifteen percent (15%) of automobile stalls required. May be covered or uncovered.
- 6. Bicycle parking: five percent (5%) of automobile stalls required.

Based on the City of Milpitas parking requirements, the townhouse development should provide 138 covered parking spaces for residents (based on 69 units), 21 guest spaces and 7 bicycle parking spaces. The site plan proposes 138 covered spaces for residents, 69 uncovered guest spaces, and 10 spaces reserved for the Cabana. Therefore, the project exceeds the City of Milpitas' parking requirements. Parking stalls should be designed to meet City of Milpitas standards.

The Americans with Disabilities Act of 1990, known as ADA, requires that developments with 201 to 300 parking spaces provide 7 handicapped spaces. Thus, the townhouse development should provide 7 handicapped spaces.

Shopping Center/Supermarket Parking Requirements

As currently proposed, the project will contain a total of 246,925 square feet (s.f.) of commercial space, including 210,925 s.f. of retail space and approximately 36,000 s.f. of restaurant space with a total of 1,137 seats. The proposed project includes surface parking with a total of 1,395 spaces within the shopping center/supermarket area.

The parking requirements for the proposed uses at the Milpitas Town Center were calculated based on the parking schedule rates contained in the City of Milpitas zoning ordinance. For retail uses, excluding restaurants, parking is to be provided at a rate of one space per 200 s.f. of gross building area. For restaurants, the current zoning ordinance requires one parking space per 3 seats plus 10 percent for employee parking. Thus, according to City code, the proposed retail space would require 1,055 parking spaces, and the proposed restaurants would require 417 parking spaces.

The parking demand generated by the proposed retail space is expected to peak at a different time of the day than the peak restaurant parking demand. Retail uses typically experience their peak parking demand between 12:00 and 3:00 PM, while restaurant parking typically peaks between 7:00 and 9:00 PM. Thus, summing the parking requirements calculated for the individual uses would result in an oversupply of parking on the project site. The City's zoning ordinance includes a provision that allows for a reduction in the total parking requirements for mixed-occupancy sites that include a mixture of day-time and night-time uses. Therefore, the total parking requirement for the proposed mixed-use project was calculated by applying the representative hourly accumulation factors obtained from the Urban Land Institute manual titled *Shared Parking* to the parking requirements calculated for each individual use.

Table 10 shows the hourly parking accumulation by percentage of peak hour on weekdays and Saturdays for retail and restaurant uses. Table 11 presents the estimated hourly parking requirement for each proposed use and for the combined mixed-use project.

The Milpitas Town Center would require the greatest number of parking spaces at 7:00 PM on weekdays when a total of 1,356 spaces would be required. It can be concluded that the proposed project parking supply of 1,395 spaces would meet the parking requirements expressed in the City's zoning ordinance after accounting for shared use.

According to the ADA, a development with 1,001 parking spaces or more is required to provide 20 handicapped parking spaces plus 1 handicapped space for each 100 spaces over 1,000. Based on a total of 1,395 shopping center spaces, the project is required to provide a total of 24 handicapped parking spaces.

Transit, Bicycle and Pedestrian Analysis

Although no deduction was applied to the estimated trip generation for the project, it can be assumed that some of the project trips could be made by transit. Assuming up to 5% transit mode share (which is probably the highest that could be expected) yields an estimate of 11 transit trips during the AM, 19 transit trips during the PM, and 17 transit trips during the Saturday peak hours. Given that the site is served by several bus routes, these riders easily could be accommodated by the existing bus service.

Table 10
Representative Hourly Parking Accumulation By Percentage of Peak Hour

	We	ekday	S	aturday
Hour	Retail	Restaurant	Retail	Restauran
6:00 AM	0%	0%	0%	0%
7:00 AM	8%	2%	3%	2%
8:00 AM	18%	5%	10%	3%
9:00 AM	42%	10%	30%	6%
10:00 AM	68%	20%	45%	8%
11:00 AM	87%	30%	73%	10%
12:00 PM	97%	50%	85%	30%
1:00 PM	100%	70%	95%	45%
2:00 PM	97%	60%	100%	45%
3:00 PM	95%	60%	100%	45%
4:00 PM	87%	50%	90%	45%
5:00 PM	79%	70%	75%	60%
6:00 PM	82%	90%	65%	90%
7:00 PM	89%	100%	60%	95%
8:00 PM	87%	100%	55%	100%
9:00 PM	61%	100%	40%	100%
10:00 PM	32%	90%	38%	95%
11:00 PM	13%	70%	13%	85%
12:00 PM	0%	50%	0%	70%

Source: ULI-The Urban Land Institute, Shared Parking. Washinton, D.C. 1983. p. 47.

Bike lanes are provided on Milpitas Boulevard north of Yosemite Drive, on Main Street south of Calaveras Boulevard, and on Jacklin Road between Milpitas Boulevard and Park Victoria Drive. Bike routes are provided along Yosemite Drive east of Milpitas Boulevard, Park Victoria Drive between Jacklin Road and Landness Avenue, Abel Street between Milpitas Boulevard and Marylinn Drive, Marylinn Drive between Abel Street and Main Street, and Calaveras Boulevard east of Park Victoria. Some of the roadways within the project area, including Calaveras Boulevard, have a street rating of "extreme caution". Roadways with this rating would not be considered ideal travel routes for bicyclists. Although some of the major roadways are not considered ideal routes for bicyclists, some people may nonetheless choose to use them for commuting purposes.

The project should provide bicycle parking per VTA recommendations. The VTA recommends inclusion of bicycle lockers for long-term and employee use (Class I parking), and bicycle racks for short-term visitor parking (Class II parking). To be effective, bicycle racks and lockers must be placed such that security is maximized, pedestrian circulation is not adversely impacted, and they can be used to their maximum design capacity. Based on VTA's *Bicycle Technical Guidelines*, 1999, the VTA recommends 1 Class I bicycle parking space for every 3 residential multi-dwelling units plus 1 Class II space for every 15 units. This equates to approximately 23 Class I and 5 Class II bicycle parking spaces. For shopping centers/supermarkets, the VTA recommends 1 Class I bicycle parking space for every 30 employees plus 1 Class II space for every 6,000 square feet of building area. The total number of employees for the proposed supermarket is unknown. Thus, the number of Class I bicycle parking spaces was not calculated.

Table 11
Estimated Hourly Parking Demand for Shopping Center

	,	Weekday			Saturday	
Hour	Retail F	Restaurant	Total	Retail	Restaurant	Total
						_
6:00 AM	0	0	0	0	0	0
7:00 AM	84	8	93	32		40
8:00 AM	190	21	211	106		118
9:00 AM	443	42	485	317	25	342
10:00 AM	717	83	801	475	33	508
11:00 AM	918	125	1043	770	42	812
12:00 PM	1023	209	1232	897	125	1022
1:00 PM	1055	292	1347	1002	188	1190
2:00 PM	1023	250	1274	1055	188	1243
3:00 PM	1002	250	1252	1055	188	1243
4:00 PM	918	209	1126	950	188	1137
5:00 PM	833	292	1125	791	250	1041
6:00 PM	865	375	1240	686	375	1061
7:00 PM	939	417	1356	633	396	1029
8:00 PM	918	417	1335	580	417	997
9:00 PM	644	417	1061	422	417	839
10:00 PM	338	375	713	401	396	797
11:00 PM	137	292	429	137	354	492
12:00 PM	0	209	209	0	292	292
Peak Hour:	1055	417	1356	1055	417	1243

Sources: City of Milpitas Zoning Ordinance Parking Schedule Rates ULI-The Urban Land Institute, *Shared Parking*. Washinton, D.C. 1983. p. 47.

Approximately 9 Class II bicycle parking spaces are recommended for the supermarket. The VTA suggests that bicycle parking be located at or near the entrances to the supermarket.

Pedestrian facilities near the project site consist primarily of sidewalks along the previously described local roadways and along streets within the surrounding residential areas. Sidewalks are available along both sides of Milpitas Boulevard and Hillview Drive. Sidewalks also are available along both sides of Calaveras Boulevard, with the exception of the south side of Calaveras between Milpitas Boulevard and Abel Street. Crosswalks are provided at all of the signalized study intersections.

The project would not impact transit, bicycle or pedestrian facilities in the vicinity of the site.

5. Future Conditions

This chapter presents a summary of the traffic conditions that would occur under future growth conditions. The purpose of analyzing future conditions is to assess the traffic conditions that would occur at the time that the proposed development becomes occupied. For this analysis, the assumed occupancy date is 2004. The analysis of future growth conditions is required by the CMP.

Roadway Network and Traffic Volumes

The intersection lane configurations under future growth conditions were assumed to be the same as described under existing conditions. Traffic volumes under future growth conditions were estimated by applying to the existing volumes an annual growth rate of 1.2 percent, then adding the trips from approved developments and the project trips.

Intersection Levels of Service Under Future Growth Conditions

The level of service results for the CMP study intersections under future growth conditions are summarized in Table 12. The results show that, measured against the City of Milpitas level of service standards, the following CMP intersection would operate at an unacceptable level of service under future conditions:

Abbott Avenue and Calaveras Boulevard – LOS F (AM Peak Hour)

The future growth intersection level of service calculations are included in Appendix D.

Table 12
Future Intersection Levels of Service

		Future		
	Peak	Ave.		
Intersection	Hour	Delay	LOS	
Abbott Ave and Calaveras Blvd	AM	82.7	F	
	РM	34.1	С	
	Sat	32.1	С	
Abel St and Calaveras Blvd *	AM	53.2	D	
	PM	59.1	E	
	Sat	44.1	D	
	Mid	44.9	D	
Milpitas Blvd and Calaveras Blvd *	AM	51.6	D	
	PM	44.2	D	
	Sat	39.6	D	
	Mid	48.5	D	
Hillview Dr and Calaveras Blvd	AM	28.5	С	
	PM	35.8	D	
	Sat	24.6	С	
Town Center Dr and Calaveras Blvd	AM	7.8	Α	
	PM	10.9	В	
	Sat	12.8	В	
Milpitas Blvd and Town Center Dr	AM	27.8	С	
	PM	30.1	С	
	Sat	33.4	С	

^{*} Denotes a CMP intersection.

6. Conclusions

The potential impacts of the project were evaluated in accordance with the standards set forth by the City of Milpitas level of service policy and the Santa Clara Valley Transportation (VTA) Congestion Management Program (CMP). The study included an analysis of AM, PM and Saturday peak-hour traffic conditions for six signalized intersections and one signalized intersection. A midday peak hour analysis was conducted for two study intersections. A signal warrant was checked at the unsignalized intersection of Hillview Drive/Town Center Drive in order to determine whether installation of a traffic signal would be justified. A CMP freeway level of service analysis was performed based on AM and PM peak hour.

For this analysis there are three sets of relevant criteria for impacts on intersections and freeways. These are based on: (1) the City of Milpitas intersection Level of Service standards, (2) the CMP intersection Level of Service standards, and (3) the CMP Freeway LOS standards. Project impacts on other transportation facilities, such as bicycle and transit facilities, were determined on the basis of engineering judgment.

Measured against the City of Milpitas and CMP level of service impact criteria, none of the signalized study intersections would be significantly impacted by the project.

The project would not have any significant impacts on bicycle, pedestrian or transit facilities.

Hillview Drive/Town Center Driveway Operational Issues

Currently during the midday and PM peak hours of traffic, a vehicle queue occasionally develops on the north leg of the intersection of Hillview Drive/Calaveras Boulevard. At times the queue extends back past the Hillview/Town Center driveway, thereby blocking the left turns into and out of the driveway. When the northbound left-turns into the driveway are blocked the northbound left-turn vehicle queue could extend out of the pocket, thus blocking northbound through traffic on Hillview Drive, although this phenomenon did not occur during our observations. This situation could potentially affect the operations at the intersection of Hillview Drive/Calaveras Boulevard. Project traffic would add to this potential operational problem.

Improvement Alternative 1 - Full Access Unsignalized Driveway

In order to remediate this operational problem, the inside southbound left-turn lane at the intersection of Hillview Drive/Calaveras Boulevard could be extended back to the Town Center driveway location in order to provide additional queuing storage. This improvement is feasible if the northbound movement of the north leg of the intersection is reconfigured as shown in Figure 12. (Figure 11 shows the existing configuration for comparison purposes.) This improvement would substantially reduce the likelihood that the project driveway would be blocked by a queue of vehicles.

Improvement Alternative 2 - Limited Access Unsignalized Driveway

The Hillview/Town Center driveway could be designated right in/right out only, and a raised median could be installed on Hillview Drive to prohibit left turns into and out of the Town Center driveway. Left turns out of the Lyons Restaurant driveway would need to be accommodated with appropriate median design to implement this improvement alternative.

Hillview Drive and Town Center Driveway Unsignalized Intersection Level of Service

The unsignalized intersection of Hillview Drive and Town Center Driveway was analyzed for level of service under project conditions based on 4 possible access alternatives. A description of each driveway access alternative and the corresponding levels of service for the worst movement are shown below.

		Worst M	ovement
	Peak	Ave.	
Description of Hillview Drive/Town Center Driveway Access	Hour	Delay	LOS
Alternative 1 - Full Access @ Town Center DW	AM	20.2	С
-	PM	39.6	Ē
	Sat	25.1	С
Alternative 2 - Limited Access (No LT into or out of Town Center DW)	AM	12.6	В
· ·	PM	14.2	В
	Sat	12.6	В
Alternative 4a - New RT Lane on Calaveras + Full Access @ Town Center DW	AM	17.9	С
	PM	22.3	С
	Sat	17.0	С
Alternative 4b - New RT Lane on Calaveras + No LT into Town Center DW	AM	14.1	В
	PM	14.2	В
	Sat	12.6	В

Improvement Alternative 3 - Signalized Driveway

Signal Warrant Analysis

A peak-hour signal warrant check (*Caltrans Traffic Manual*, Chapter 9, Warrant 11) was performed at the unsignalized intersection of Hillview Drive and Town Center Drive to determine whether signalization would be justified on the basis of project peak hour volumes. The analysis revealed that this unsignalized intersection would not meet the Caltrans peak hour volume warrant during the AM, PM or Saturday peak hours of traffic and, therefore, would not warrant signalization under project conditions.

Although the intersection of Hillview Drive and Town Center Drive would not warrant signalization based on the Caltrans peak-hour volume warrant, additional traffic analysis was performed at this location to see if a signal would in fact be feasible during the AM and PM peak hours of traffic. A detailed traffic simulation model was developed to determine whether or not the intersection would function properly and efficiently if signalized. The results of the traffic signal analysis are described below.

Simulation Model Description

The analysis was conducted using the Synchro 5 and Sim Traffic software packages. Synchro 5 is used to model and optimize traffic signal timings, and employs the 2000 Highway Capacity Manual methodology for level of service analyses at signalized and unsignalized intersections. SimTraffic is a microscopic traffic simulation software package that utilizes input and output data from Synchro 5 to simulate traffic conditions on roadway networks.

The potential signal at Hillview Drive and Town Center Drive would be coordinated with the adjacent signal at Hillview Drive and Calaveras Boulevard. The simulation analysis demonstrated that with the current intersection configuration, the northbound left-turn vehicle queue occasionally would extend to Calaveras Boulevard during the PM peak hour, but would not adversely affect operations at that intersection. The simulation model showed that once the queue reached Calaveras Boulevard, traffic began to flow and all queued vehicles were able to clear the intersection of Hillview Drive and Town Center Drive in one signal cycle.

The traffic simulation showed that a signal at the intersection of Hillview Drive and Town Center Drive would effectively serve the projected AM and PM peak hour traffic volumes and would operate efficiently.

Improvement Alternative 4 – New Driveway on Calaveras Boulevard

A new inbound only driveway with access off of westbound Calaveras Boulevard could be constructed at some location between the Calaveras/Hillview and Calaveras/Town Center intersections. The new driveway could be utilized by inbound traffic in conjunction with the Hillview/Town Center driveway. In this case, the new driveway would reduce the number of vehicles entering the shopping center at the full access Hillview/Town Center driveway. The new inbound driveway also could replace the northbound left-turn access at the Hillview/Town Center driveway, thus receiving all of the inbound traffic that would have used the northbound left-turn lane at Hillview/Town Center driveway.

Recommendation

Once the proposed Milpitas Town Center redevelopment project is complete, the unsignalized intersection operations of Hillview Drive and Town Center Drive should be closely monitored. Should the intersection experience operational problems, one of the improvement alternatives described above should be implemented.

Intersection Operations Analysis

An operations analysis was performed for study intersections where the project would add trips to the left-turn movements. The analysis indicated that the estimated maximum vehicle queues for some of the high-demand left-turn movements would exceed the existing vehicle storage capacity under project conditions. The following intersections would have inadequate storage capacity under project conditions.

Abel Street & Calaveras Boulevard – WB left-turn movement (AM, PM and Sat peak hours)

The westbound left-turn movement currently has one left-turn lane with approximately 325 feet of queuing storage. Under background conditions, the movement would require 450 feet of queuing storage during the Saturday peak hour. The project would add 15 trips to the westbound left-turn movement during the Saturday peak hour, thereby increasing the 95th percentile queuing demand by one vehicle. Adding a second westbound left-turn lane would improve the intersection operations at this location by providing a total of approximately 650 feet of queuing storage, which is more than the 450 feet of storage that would be required under project conditions.

Milpitas Boulevard & Town Center Drive – SB left-turn movement (AM, PM and Sat peak hours)

The southbound left-turn movement currently has one left-turn lane with approximately 115 feet of queuing storage. Under background conditions, the movement would require 100 feet of queuing storage during the PM peak hour. The project would add 41 trips to the southbound left-turn movement during the PM peak hour, thereby increasing the 95th percentile queuing demand by two vehicles (50 feet). Extending the southbound left-turn pocket by approximately 35 feet in order to provide the 150 feet of queuing storage that would be necessary under project conditions would improve the overall operations at this intersection. Median landscaping would need to be removed in order to extend the turn pocket. City of Milpitas staff should decide whether they want to pursue this potential improvement.